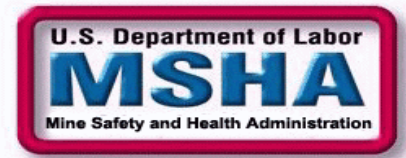
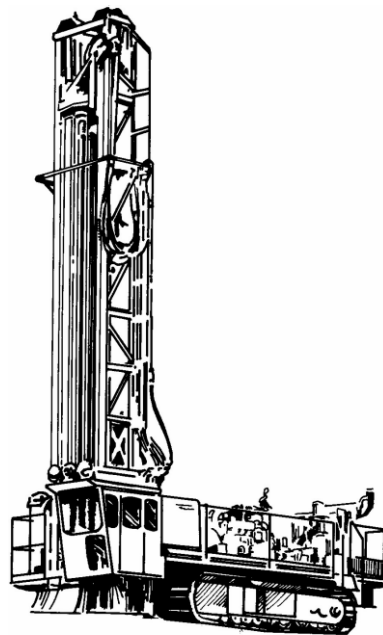
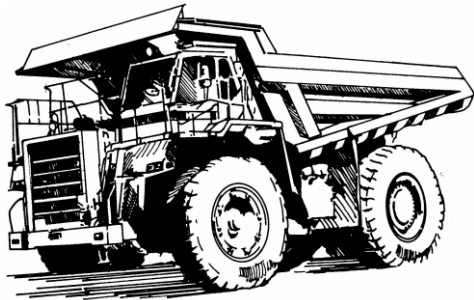


## Noise Control Resource Guide – Surface Mining



U. S. Department of Labor  
Mine Safety and Health Administration  
(May 2012 Revision)



**U.S. Department of Labor  
Mine Safety and Health Administration**

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## **NOISE CONTROL RESOURCE GUIDE – SURFACE MINING**

### **PREFACE**

The Mine Safety and Health Administration's (MSHA) Noise Control Resource Guide series is a compendium of resource information and guidance for reducing miners' noise exposures at coal and metal and nonmetal surface mines, underground mines, and mills and preparation plants. The Noise Control Resource Guides represent the Agency's continuing efforts to assist mine operators in lowering noise exposure, preventing miner hearing loss, and achieving compliance with the Occupational Noise Exposure Standard (30 CFR Part 62).

Within this guide, you will find information that will help you:

- ❖ Identify noise sources on surface mining machinery.
- ❖ Determine the availability of engineering noise controls from original equipment manufacturers (OEMs) for new equipment.
- ❖ Identify sources of retrofit noise controls from the OEMs and after-market suppliers of noise controls, and in some cases, provides information on engineering controls that can be designed, fabricated, and installed at the mine site.
- ❖ Identify contacts for machinery suppliers and suppliers of sound and vibration controls and materials.

Technical experts and practitioners in the field of noise in the mining industry, as well as manufacturers of noise control equipment, provided information contained in this noise control resource guide. The material found in this guide should be considered a resource and not be construed to be a mandatory requirement. This guide should be used in conjunction with MSHA Program Information Bulletin (PIB) P11-45 "Technologically Achievable, Administratively Achievable and Promising Noise Controls (30 CFR Part 62)".

Due to the variability of the mining environment, it would be difficult to compile a document that would present controls that are feasible in each and every situation. The individual noise controls or series of controls found herein can reduce the exposure of most miners; however, they must be designed, tailored, and implemented according to the specific situation. Questions regarding technical applicability and feasibility of the controls to a specific mining situation should be referred to the local MSHA office.

### **DISCLAIMER**

These guides are a compendium of resource information and guidance for reducing a miner's overexposure to noise. However, it is not an "all encompassing" answer to every problem dealing with overexposure to noise. There are three things the reader should keep in mind:

1. Every type of equipment used in mining operations is not included in these guides. Only the more common equipment types are discussed.

2. With regard to manufacturers of mining equipment and distributors of control products, the industry is a very dynamic one. Companies change names, merge, go out of business, relocate, etc. Thus, some of the information contained in the appendices may not be the most current. It is suggested that the reader may want to explore the Internet, or some of the monthly periodical magazines for current manufacturer/distributor information.
3. Reference to manufacturers is made to facilitate understanding and does not constitute an endorsement by the Mine Safety and Health Administration.

## **INTRODUCTION**

MSHA promulgated Health Standards for Occupational Noise Exposure for the metal, nonmetal, and coal mining industry (30 CFR Part 62) in an effort to reduce the number of miners who will experience a material impairment of hearing. Part 62 establishes the full shift Permissible Exposure Level (PEL) at a Time Weighted Average over eight hours ( $TWA_8$ ) of 90 dBA (100% Dose) and establishes an Action Level (AL) at a  $TWA_8$  of 85 dBA (50% Dose). The operator is required to enroll affected miners in a Hearing Conservation Program if the AL is met or exceeded. If the PEL is exceeded, the mine operator is required to use all feasible engineering and/or administrative controls to reduce miner's exposure to the PEL.

The Noise Control Resource Guides deal with noise controls that are available on types of mining equipment typically used in different mining environments. The first guide covers surface mining; the second, underground mining; and the third, mills and preparation plants.

These guides will reference the type of mining equipment and noise controls that are available from the manufacturer of the equipment or as a retrofit for the equipment. If the cost of the control is well established and reliable, this information is also included. The guides do not address generic administrative controls that are universally accepted as being effective, i.e., rotation of workers, time limitations, distance, etc. However, if specific administrative controls have been shown to provide significant noise reduction, these administrative controls will be discussed with the equipment or the process. The guides also contain appendices that list equipment manufacturers, noise control products, aftermarket manufacturers, reference sources and contact information; however, these lists are not all inclusive.

## **NOISE EXPOSURE REDUCTION**

In general, the amount of noise reduction achievable by and the technological achievability of a given noise control or a group of noise controls is widely variable and must be considered on a case-by-case basis. The amount of noise reduction that can be obtained from an individual noise control or suite of controls is dependent on a large number of factors:

- ❖ Type and model of machine
- ❖ Number and types of controls implemented
- ❖ Physical environment in which the machine is used
- ❖ Acoustical environment in which the machine is used
- ❖ Type of work the machine is performing
- ❖ Presence of other noise sources in the environment
- ❖ The degree to which the machine is noise-controlled prior to the installation of additional retrofit noise controls
- ❖ Quality of materials that are selected and used
- ❖ Quality of the installation of the controls
- ❖ Quality of the maintenance program for the machine
- ❖ Maintenance of noise controls
- ❖ Use of engineering controls in combination with administrative controls
- ❖ Experience of operator in using the machine

For these reasons, each of the machine and noise controls shown in this guide do not have specified noise reductions. Such figures are only obtainable after a complete acoustical investigation is conducted on each individual machine. Each noise control case study has a set of conditions that are unique to it.

Since the noise standards treat engineering controls equally with administrative controls, one may use either engineering or administrative controls or a combination of both to reduce miner's exposures. Each noise control guide is a valuable source of information for mine operators to use when deciding what type of mitigative action is best suited for the conditions encountered at their operation. In addition to the applicability of the control, the operator will need to consider the specific materials used when installing an engineering control. It is important to remember that the effectiveness of any engineering control used to reduce noise exposures is dependent on the appropriately selected, correctly installed, and properly maintained acoustical material. As with most everything used in the mining industry, if an effective maintenance program is not put in place, the noise control will not last. Sometimes noise controls are expensive. It is in the operator's best interest to maintain the controls so as to reap the benefits of their investment.

## **DOSE FROM MULTIPLE NOISE SOURCES**

Special considerations should be afforded to multiple noise sources, a situation common in the mining industry. Multiple noise sources present unique challenges in their measurement and control. The effectiveness of noise controls on multiple noise sources needs to be systematically evaluated in light of their contribution to a miner's exposure. To further illustrate this, consider the following:

When it is determined that there are multiple noise sources that contribute to a miner's noise exposure, and that these sources expose the miner to high levels of noise in a serial fashion, general noise control practices would direct you to lower the sound level of the highest noise source. However, noise exposure (dose) is a function of the sound level AND the amount of time the miner is exposed to the noise. Therefore, in planning which noise source(s) to treat, it is important to look at the sound level and the exposure time.

Table 1 illustrates the roles of sound level and exposure time. A particular miner's exposure is comprised of four levels and intervals: S1, a source of 90 dBA for 4 hours; S2, a source of 95 dBA for 2 hours; S3, a source of 100 dBA for 1 hour; and S4, a source of 88 dBA for 1 hour.

<b>Table 1. – Data for Example Calculations Involving Multiple Sound Sources</b>				
<b>Source</b>	<b>Sound Level (dBA)</b>	<b>Measured Exposure Time (Hr.)</b>	<b>Allowable Exposure Time (Hr.)</b>	<b>% Contribution to PEL Dose</b>
S1	90	4	8	50
S2	95	2	4	50
S3	100	1	2	50
S4	88	1	-	0
S3 mod	97	1	3.05	33
S1 mod	87	4	-	0
S2 mod	92	2	6.1	33

The miner's exposure [S1 + S2 + S3 + S4], computed in terms of percent dose compared to the permissible exposure level (PEL), with a 90 dBA threshold for 8 hours, is 150% [50 + 50 + 50 + 0].

By treating only the highest sound level source (S3) by application of an engineering noise control and reducing it from 100 dBA to 97 dBA (S3 mod), the miner's exposure [S1 + S2 + S3 mod + S4] would be 133% [50 + 50 + 33 + 0].

However, if the source to which the miner is exposed for most of the time (S1) is modified to obtain a 3 dBA reduction from 90 to 87 dBA [S1 mod], the impact is to reduce the miner's exposure [S1 mod + S2 + S3 + S4] to 100% [0 + 50 + 50 + 0]. Actually, a noise control yielding only a 1 dBA reduction applied to (S1) would achieve the same result.

If sources (S1) and (S2) are treated by 3 dBA each reductions from 90 dBA to 87 dBA and from 95 dBA to 92 dBA obtained, the miner's resultant exposure [S1 mod + S2 mod + S3 + S4] would be 83% [0 + 33 + 50 + 0].

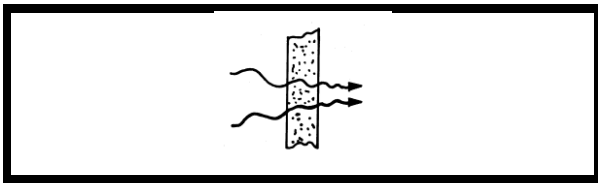
It is very important when conducting noise control work to examine the makeup of the miner's full shift noise exposure. The exposure may not be based solely on the highest sound level or the longest exposure time. It is the total noise dose, not just the individual sound levels or exposure times.

## ACOUSTICAL MATERIALS

Acoustical materials can reduce noise either by absorbing or blocking sound waves, or damping vibrations. These materials are generally referred to as absorption, barrier, composite, and damping materials, and they can substantially increase the effectiveness of other acoustical devices. Selection of appropriate acoustical materials must be made based on a firm noise control engineering basis and commensurate to the task, properly installed, used, and maintained.

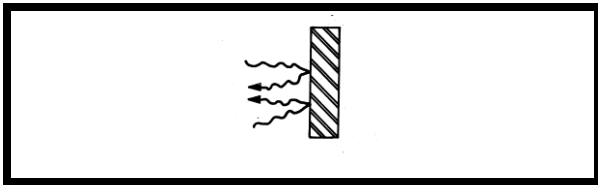
Acoustical devices include, but are not limited to, mufflers, silencers and enclosures. Absorption, barrier, composite, and damping/isolation materials are defined as follows:

### Absorption



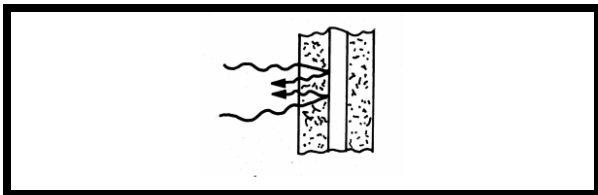
A material designed to absorb sound waves. It is not intended to be used for blocking sound waves. Some examples of absorption materials are foam and fiberglass. It may be used inside a cab or enclosure to prevent the reverberation of sound waves.

### Barrier



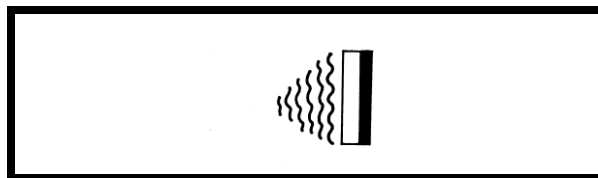
A material designed to block sound waves. It does not absorb sound waves. A typical use of barrier materials would be on the firewall of a bulldozer to block low frequency engine noise. Some examples of sound barriers are mass-loaded vinyl curtains, lead, plywood, glass, steel, and concrete.

### Composite



A material designed to both absorb and block sound. It may be used to provide additional barrier qualities to an enclosure or operator cab as well as absorption of radiating sound waves. Some examples are combinations of foam, vinyl, fiberglass, and lead.

### Damping/Isolation



Materials designed to damp, remove the ring from vibrating surfaces, and decouple source from structure.



## FLAMMABILITY GUIDELINES

Although current MSHA regulations do not restrict the use of acoustical materials due to their flammability characteristics, MSHA has established a voluntary guideline regarding the flame spread index of acoustical materials. These indices were established based upon the results of ASTM E-162 – Radiant Panel Tests. Basically, a flame spread index of 25 or less is recommended for acoustical materials installed on equipment used in underground mines and a flame spread index of 50 or less for acoustical materials installed on equipment used at surface operations. Prior to the selection, installation and use of acoustical materials, operators should be aware of their flammability properties.

## INSTALLATION METHODS

Acoustical materials may be installed in the following ways:

1. Adhesives – The use of an industrial adhesive requires a thorough cleaning of the surface area. The adhesive should then be applied according to the manufacturer's specifications. While the use of adhesives is economical and effective for installing the materials, the material cannot be removed intact and a potential hazard may exist from toxic fumes if subjected to intense heat. Also special solvents, that may have special conditions for use to avoid potential toxicity problems, may be needed to remove the adhesives.
2. Stud Welding – This method involves the use of a stud welder to attach a threaded, copper-coated stud to a metal surface such as a cab wall. The stud welder consists of a capacitance discharge unit and a hand-held triggering device, which holds the stud in place for welding. Upon release of the charge, an arc is struck between the tip of the stud and the metal surface, heating a small area. Simultaneously, the stud is plunged into the molten metal and the weld is completed. For a good quality weld the metal paint must be removed from the metal. The acoustical material is placed over the stud and secured with a rubber-cover button. This cover button not only holds the material in place, but offers a physical protection from the metal stud. The stud-welding method requires little surface preparation and allows for the removal and reinstallation of the materials for maintenance or repairs.
3. Bolts and Straps – Material may be held in place utilizing metal straps, which are secured by bolts and nuts at each end. This type of installation allows for easy removal and replacement of the acoustical material without damage. A perforated metal covering may be used in place of the straps to secure and protect the acoustical material.
4. Stick-on Studs – This method involves the use of threaded studs pre-welded to a metal disc having a self-adhesive backing. Surface preparation involves a thorough cleaning to remove oil, grease, or other contaminants. These studs may be attached to all types of surfaces. The materials are then pushed over the studs and held in place with a rubber-cover button. In some situations the weight of the acoustical materials may have an effect on the load bearing characteristics of the stick-on studs. Care should be taken.

## COMPLIANCE ASSISTANCE

MSHA has produced several documents to aid the mining industry in complying with Part 62. These include:

- ❖ Hearing Protector Noise Reduction Rating List
- ❖ Compliance Guide to MSHA's Occupational Noise Exposure Standard – IG 33
- ❖ A Guide to Conducting Noise Sampling – IG 32
- ❖ Audiometric Testing Reference Guide for MSHA's Occupational Noise Exposure Standard – IG 57
- ❖ Program Policy Letter No. P04-IV-I and P04-V-1 Noise Enforcement Policy
- ❖ Program Information Bulletin (PIB) No. P08-12 “Technologically Achievable, Administratively Achievable and Promising Noise Controls” (30 CFR Part 62) dated June 18, 2008
- ❖ Program Information Bulletin (PIB) No. P11-45 “Technologically Achievable, Administratively Achievable and Promising Noise Controls” (30 CFR Part 62) dated June 20, 2011

MSHA will work with mine operators, miners, labor unions, industry associations, noise partnerships, mining equipment and noise control manufacturers, noise engineering professionals, and the National Institute for Occupational Safety and Health (NIOSH) in updating this document to reflect new solutions and experiences in controlling occupational noise exposures in the mining industry.

These compliance assistance documents are all available at MSHA's web site at [www.msha.gov](http://www.msha.gov).

## SURFACE MINING NOISE CONTROLS

In surface mining, there is a wide variety of equipment used as well as site-specific mining practices, etc. The first recommendation in controlling noise is to identify the highest noise exposure tasks and the sources that contribute to the miner's noise exposure. Thus, it may be necessary to examine all aspects of the work shift and the equipment operated by the specific miner, as well as the equipment which may be positioned in close proximity to the miner.

### 1. Engineering Controls

The application of engineering noise controls to surface mining equipment may, in general terms, be a more complicated task compared to underground or processing facilities. In the case of new equipment, it is most advantageous to purchase the equipment from the manufacturer with the noise controls already engineered into the unit. If there is the availability of a fully-treated operator cab, then in many cases, the fully treated operator cab would be the most effective means of protecting the miner from overexposure. In the holistic approach, the treated cab would protect the miner from dust, temperature extremes, as well as overexposure to high sound levels. In the case of retrofit engineering controls on existing equipment, this may

necessitate the removal of the equipment from the job site. In many instances, the noise controls can be applied during a scheduled rebuild. In some situations, the utilization of radio remote controls to remove the miner from the close proximity of the equipment may be considered.

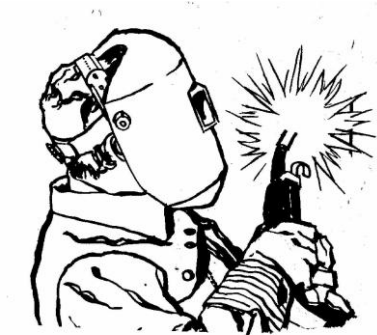
## 2. Administrative Controls

There are many possible combinations of administrative controls that may be used to reduce a miner's noise exposure. A few general techniques to consider are time management, including maintenance during idle time and work rotation. Also, dividing routine work between different work shifts and changing actual shift lengths are other examples of administrative controls that may be utilized. However, because of the site-specific work practices, administrative controls need to be considered on a case-by-case basis.

## ***AIR/ARC GOUGING***

---

Air/Arc gouging is a process used throughout the mining industry to cut or gouge metal. A specially designed rod is placed into a modified holder that also houses a compressed air line. An electric arc is established between the rod tip and the base metal surface then compressed air is directed from the rod holder at the molten metal to literally blow it away. This process is commonly used to repair existing welds on bulldozer blades or dragline buckets etc.



### **1. Original Equipment Manufacturer (OEM)**

Most welding supply company's offer the specially designed rod used in this process.

### **2. Retrofit Noise Controls**

There is none available at this time.

### **3. Alternative Technology**

Copper-clad carbon rods can be substituted with alternate metal gouging rods and methods. The following table lists products and manufacturers that have alternate technology that produce lower noise levels than the standard copper-clad rods when used for the same application. Each manufacturer should be contacted for applicability of their product to each process or situation.

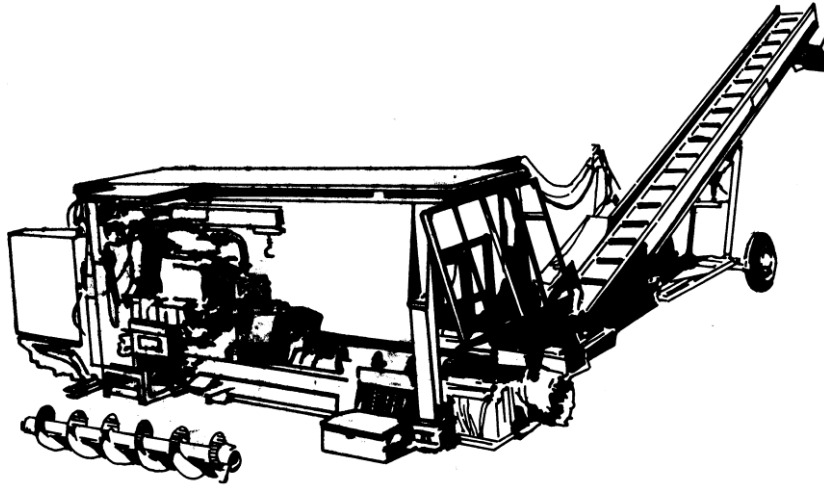
<b>Alternate Technology Which Produce Lower Noise Levels</b>	
<b>Manufacturer</b>	<b>Product</b>
Certanium	Certanium Rod
Cronatron Welding Systems, Inc.	Cronatron Rod
Rockmont Research & Alloys, Inc.	Electra Rod
Magnum Manufacturing, Inc.	Magnum Rod
Hypertherm, Inc.	Hypertherm-Plasma Arc
Petrogen International, LTD	Petrogen *
* Metal cutting tool only, unable to gouge.	

#### **4. Administrative Controls**

- A. Discourage side-by-side gouging on shovel or dragline buckets.
- B. Reduce air-pressure to a minimum.
- C. Use constant voltage air arc gouging techniques instead of constant current air arc gouging techniques.
- D. Use constant current air arc gouging techniques at the lowest effective current and air pressure.
- E. Use constant voltage air arc gouging techniques at the lowest effective voltage and air pressure.

## ***AUGERS – SURFACE***

Surface augers are utilized by strip mine operators when the overburden is too thick to be removed economically. Large diameter holes are drilled into the coal bed by an auger. The auger consists of a cutting head with screw-like extensions. As the auger turns, the head breaks the coal and the screw carries it back into the open where it dumps onto a conveyor.

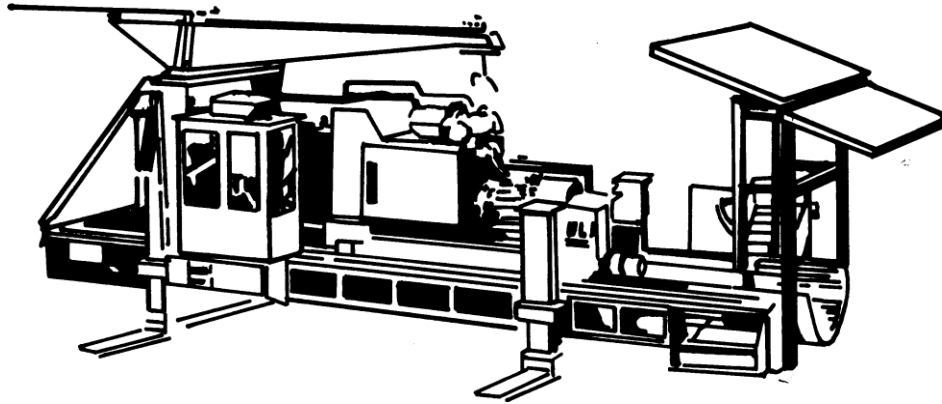


### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for new surface augers. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>			
<b>Manufacturer</b>	<b>Treated Cab Standard/Optional</b>	<b>Treated Engine Housing Standard/Optional</b>	<b>Muffler</b>
Brydet Development Co.	X	X	X
Salem Tool Company	Optional	X	X
"X" indicates product availability.			

For surface augers without noise controls, retrofit noise controls are needed. Details regarding retrofit approaches are in Section 2.



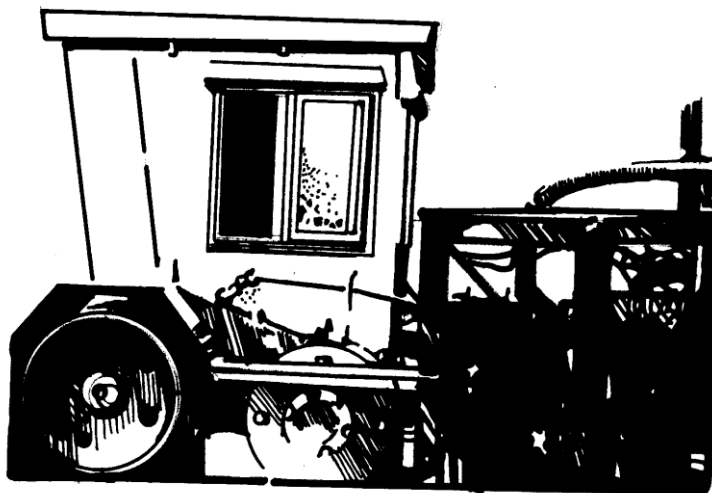
Surface Auger with Operator Cab

## 2. Retrofit Noise Controls

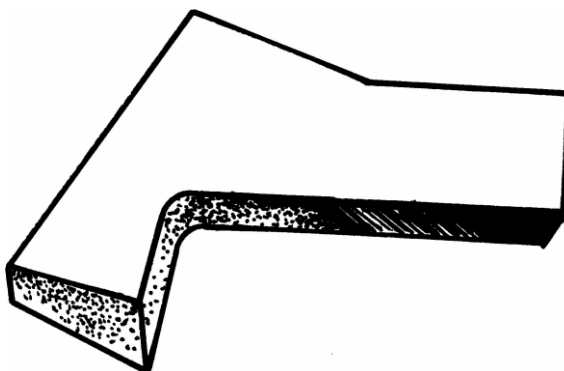
A commercially available operator cab is an effective noise control for a surface auger. The following table illustrates OEMs offering retrofit noise controls for surface augers. Local dealers should be contacted for further details.

Retrofit Noise Control Availability from OEMs	
Manufacturer	Treated Cab
Brydet Development Company	X
Salem Tool Company	X
"X" indicates product availability.	

Additional retrofit noise controls consist of the construction of homemade cabs from sheet metal or flame-retardant plywood. Engine enclosures and noise barriers located between the miners and the diesel engines are also effective noise controls. Costs will vary depending upon size and local material pricing.



Example of a Home-Made Cab



Acoustical Absorption Material

Homemade cabs should be lined with an acoustical absorption material. Absorption material costs vary with supplier. Appendix B lists sources for purchasing acoustical materials.

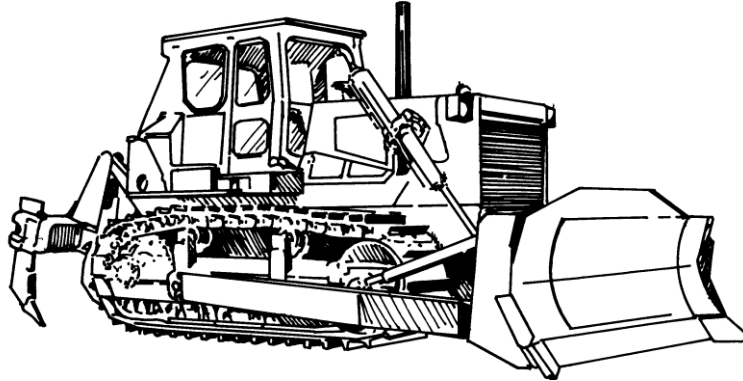
### **C. Alternative Technology**

There is no alternative technology.



## ***BULLDOZERS***

Bulldozers are used throughout the mining industry (both above and, to a limited extent, below ground). They are primarily utilized to push overburden. They can also be used with a ripper blade (attached on the rear) to expose new material or they can serve as an auxiliary power source for pan scrapers.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering full cabs on their new bulldozers. Local dealers should be contacted for availability and cost.

<b>Noise Control Availability from OEMs</b>			
<b>Manufacturer</b>	<b>Fully-Treated Cab</b>	<b>Muffler</b>	<b>Air-Conditioning</b>
Caterpillar	X	X	X
Fiat-Allis (New Holland)	X	X	X
International	X	X	X
J. I. Case (CNH Global)	X	X	X
John Deere	X	X	X
Komatsu	X	X	X
VME (Michigan)	X	X	X
“X” indicates product availability.			

The manufacturer of new equipment should be consulted for details regarding noise levels inside the cab. If new equipment is purchased with a bare cab, or for older equipment without noise controls, additional retrofit controls are needed. For details regarding retrofit approaches, refer to Section 2.

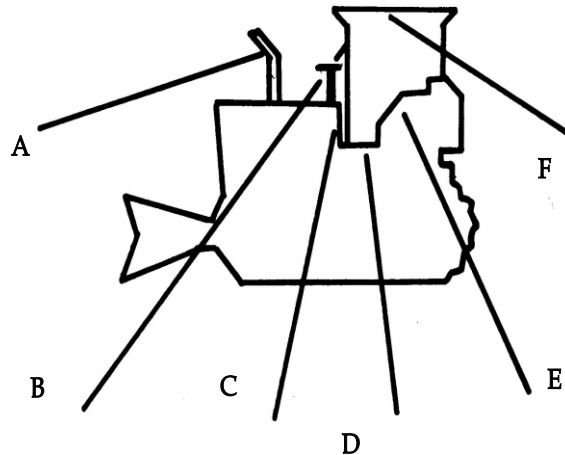
## 2. Retrofit Noise Controls

This section is for dozers without cabs and for dozers with untreated cabs. Cabs for dozers can be supplied directly to the mining companies by the aftermarket companies. Partial lists of these companies are in Appendix C.

The effectiveness of noise controls on retrofit cabs is dependent upon the quality of both materials and installation. If a pre-cut acoustical material kit is not available, the materials may be purchased in bulk form using Appendix B as a guide. If air-conditioning is needed, the companies below provide this service:

Eagle Eng & Mfg., Inc.	Welcome, Minnesota	(800) 533-0528	(800) 722-0577 in MN
Red-Dot Corp.	Seattle, Washington	(206) 575-3840	

The following are the major areas where noise controls should be applied on a bulldozer with a retrofit cab:



Areas Where Noise Controls May Be  
Applied to a Bulldozer

**A. Engine Exhaust**

Install an exhaust muffler and extend the stack above the top of the cab, directed to the rear of the machine.

**B. Control Levers**

Install rubber “boots” around the base of the control levers to prevent engine noise from entering operator area.

**C. Firewall**

Install composite material on the firewall to prevent engine noise from entering the cab.

**D. Floor**

Tighten down any loose floor plates. Cover the floor with an acoustical floor mat material to prevent transmission noise from entering the cab. Cut the floor mat so as to minimize openings for floor pedals, yet permit their full movement.

**E. Seat**

Install barrier or composite material on the base of the seat to prevent noise from traveling from the transmission access area into the cab.

**F. Ceiling/Wall**

Cover reflective surfaces on the inside of the cab with a sound absorbing material. If a full cab is not available, a front shield may be installed. The noise reduction obtained will typically be less than that for a full cab.

The following are the major areas where noise controls should be applied on a dozer without a cab:

- |                   |                         |
|-------------------|-------------------------|
| 1. Engine         | 4. Floor                |
| 2. Control Levers | 5. Seat                 |
| 3. Firewall       | 6. Front Barrier Shield |

Steps A through F have been described previously. These are the requirements for a front barrier shield:

#### **A. Front Barrier Shield**

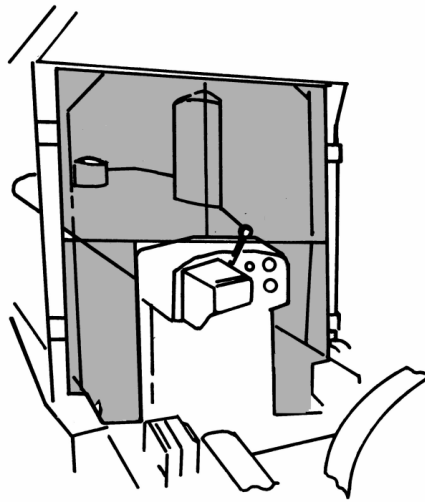
The front barrier shield must be installed to isolate the operator from the engine and the exhaust noise.

#### **B. Mounting Device**

The front barrier shield is attached to the bulldozer by any of several means such as welding, “U”-bolts, straps, etc. If welded, it must be done by a certified welder, according to manufacturer’s directions, so as to not violate the certification of the ROPS and FOPS.

#### **C. Seals**

The gap at the top and base of the barrier, along with the gap around the cowl, must be sealed using closed-cell material, such as rubber, to prevent noise from leaking around the barrier.



Installed Front Barrier Shield

### **3. Alternative Technology**

Radio remote control systems are now becoming available for a wide range of equipment. The use of bulldozers having radio remote controls, in conjunction with an appropriate exhaust muffler, can reduce operator noise exposure. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated  
 Main Street  
 Glen Williams, Ontario L7G 3T6  
 Canada  
 Phone: 905.873.0141  
 Fax: 905.877.1809

Catron, Incorporated  
 58 West Shenago Street  
 Sharpsville, Pennsylvania 16150-1198  
 Phone: 412.962.3571  
 Fax: 412.962.4310

Futaba Corporation of America  
 2170 William Pitt Way  
 Irvine, California 92618  
 Phone: 714.455.9888

Joy Mining Machinery  
 177 Thorn Hill Road  
 Warrendale, Pennsylvania 15086  
 Phone: 724.779.4500

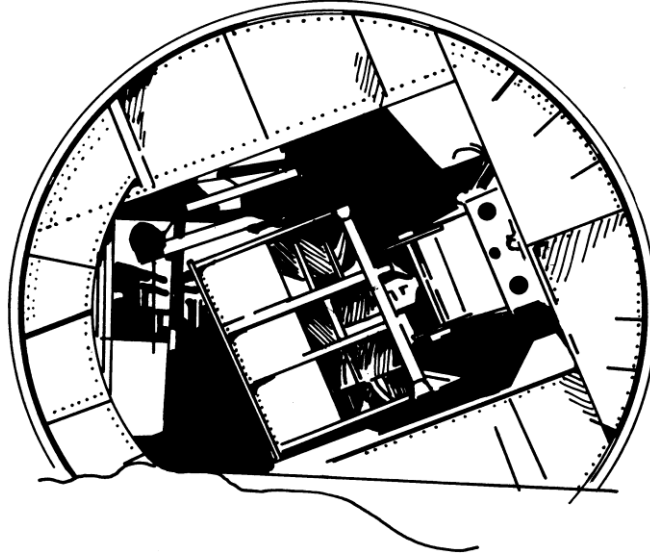
Moog Incorporated—Industrial Division586  
 Electrohydraulic Servocontrol  
 Department T  
 East Aurora, New York 14052  
 Phone: 716.652.2000

Tunnel Radio of America  
 33868 Southeast Eastgate Circle  
 Corvallis, Oregon 97333-2248  
 Phone: 541.758.5637  
 Fax: 541.758.1417

Vectran Corporation  
 4 Studebaker  
 Oakmont, Pennsylvania 15139  
 Phone: 412.826.3100

## ***CAR SHAKERS***

Car shakers are electromagnets that come to rest on the bottom of rail dump-cars. Their function is to literally shake the body of the rail car, so that all of the material inside falls out. They are typically used in the coal and cement industries.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for car shakers. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>					
<b>Manufacturer</b>	<b>Retrofit</b>	<b>Foot Pads</b>	<b>Top Attenuator</b>	<b>Muffler</b>	<b>Air Actuated Cushion</b>
Allis (METSO)	None	None	None	None	None
Branford Vibrator Company (Cougar Vibration Company)	None	None	None	None	None
General Kinematics	None	None	None	None	None
Hewitt-Robins (Goodman-Hewitt)	None	X	None	None	None
Isco Ltd.	None	None	None	None	None
Kinergy Corporation	X	None	X	X	None
Martin Engineering	None	None	None	X	X

Noise Control Availability from OEMs					
Manufacturer	Retrofit	Foot Pads	Top Attenuator	Muffler	Air Actuated Cushion
Vibco	None	None	None	None	None
Global Manufacturing	None	None	None	X	None
Reynolds	None	None	None	None	None
“X” indicates product availability.					

Additional retrofit noise controls are available for car shakers that do not meet specific noise standards. Details are given in Section 2.

Hewitt-Robins  
(Goodman-Hewitt)

Foot pads for cars can be added.

Kinergy Corporation

Top attenuators are standard on most models, but can be purchased separately, depending upon the model.

Martin Engineering

Air actuated cushions, which eliminate metal-on-metal impact, are available.

## 2. Retrofit Noise Controls

### A. Rotary Dump

Install rotary dump to replace car shake-out.

### B. Impact Pads

Mount impact pads to shaker.

### C. Operator Control Booth

A commercially-available operator control booth can be purchased or a home-made booth can be fabricated. An acoustically-treated enclosure can be constructed from either flame-retardant plywood or sheet metal.

The structure can be supported by either treated lumber posts or angle iron framework. Safety glass should be used for windows. The interior of the booth should be treated with fiberglass absorptive material. This material will absorb sound that enters the booth.

### 3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of car shakers having radio remote controls can offer substantial noise reductions. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated  
Main Street  
Glen Williams, Ontario L7G 3T6  
Canada  
Phone: 905.873.0141  
Fax: 905.877.1809

Catron, Incorporated  
58 West Shenago Street  
Sharpsville, Pennsylvania 16150-1198  
Phone: 412.962.3571  
Fax: 412.962.4310

Futaba Corporation of America  
2170 William Pitt Way  
Irvine, California 92618  
Phone: 714.455.9888

Joy Mining Machinery  
177 Thorn Hill Road  
Warrendale, Pennsylvania 15086  
Phone: 724.779.4500

Moog Incorporated—Industrial Division  
Electrohydraulic Servocontrol  
Department T  
East Aurora, New York 14052  
Phone: 716.652.2000

Tunnel Radio of America  
33868 Southeast Eastgate Circle  
Corvallis, Oregon 97333-2248  
Phone: 541.758.5637  
Fax: 541.758.1417

Vectran Corporation  
4 Studebaker  
Oakmont, Pennsylvania 15139  
Phone: 412.826.3100



## ***CHANNEL BURNERS***

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Channel burners are usually a home-made piece of equipment. Channel burners are devices used to cut granite or similar materials in the dimension stone industry. They are broadly classified as either hand-held or automatic. Both types use a mixture of either air or oxygen and diesel fuel. The hand-held is essentially a long tube with a flame at one end that is passed over stone to create a deep channel by shattering the rock. The automatic version raises and lowers the tube as it travels over a small section of rail track.



### **1. Original Equipment Manufacturer (OEM)**

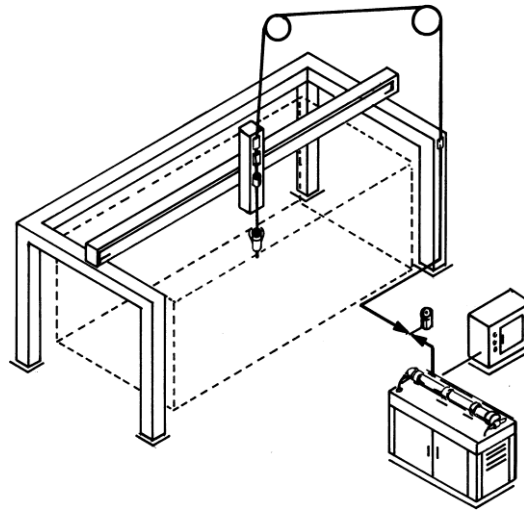
Currently, there is no known OEM for hand-held manual channel burners (referred to also as “wands”).

### **2. Retrofit Noise Controls**

Currently, there are no known retrofit noise controls for hand-held manual channel burners (referred to also as “wands”).

### **3. Alternative Technology**

An automated channel burner may be considered as alternative methods for using the hand-held channel burner (wand).



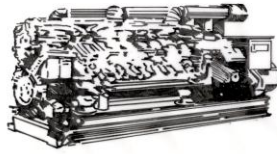
Automatic Channel Burner

OEMs Who Offer Automated Channel Burners			
Manufacturer/Distributor	Automated Channel Burner	Waterjet Cutter	Wire Diamond Saws
Thermal Channeling (706) 283-4505	X	None	None
John Lutz (706) 283-7528	X* *Ramjet Airburner	None	None
NedJet Cutting Systems, Inc. (508) 798-8546	None	X	None
Precision Stonecraft	None	None	X
"X" indicates product availability.			

## ***COMPRESSORS***

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An air compressor is driven by either a power take off, an internal combustion engine, or an electric motor to generate compressed air. This air is typically used to power drills on surface operations.



### **1. Original Equipment Manufacturers (OEM)**

The following lists OEMs offering standard noise control equipment on new compressors. Local dealers should be contacted for specific needs and details.

- A. Joy Technologies (Diesel)
- B. Sullair (Diesel)
- C. Gardner-Denver (Diesel)
- D. Ingersoll-Rand (Electric)

### **2. Retrofit Noise Controls**

Use prudent site planning to locate noise-generating equipment away from work areas and especially entrances to slopes or shafts.

Use prudent site planning to eliminate cumulative noise levels of equipment.

Provide noise barriers or enclosures around high noise level equipment.

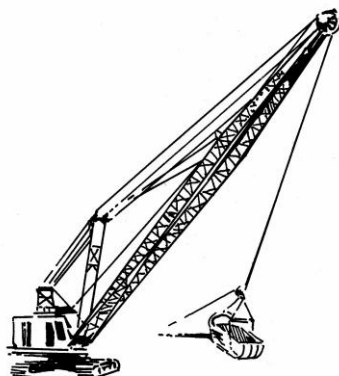
Construct or install a barrier of plywood or other material to reduce exposure to noise from diesel engine. An alternate would be to set up the compressor at a remote location away from normal work areas.

### **3. Alternate Technology**

The use of electric compressors eliminates noise associated with diesel engines.

## CRANES

Cranes are machines designed for lifting and transporting heavy weights from above. Typically, cranes are used to position equipment in quarries, lift blocks of stone, or lift heavy parts in repair shops.



### 1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new cranes. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs			
Manufacturer	Acoustically-Treated Cab	Sound Suppression Kit	Muffler
Manitowoc	X	None	X
Koehring	X	X	X
Mannesmann Demag	X	None	X
National Crane (Manitowoc)	X	None	X
American Crane	X	None	X
Marathon Letourneau	X	None	X
Komatsu Dresser	X	None	X
Bucyrus Erie	X	None	X
P&H	X	None	X
"X" indicates product availability.			

## **2. Retrofit Noise Controls**

### **A. Exhaust Muffler**

An exhaust muffler should be installed if there is none present or if the existing muffler is faulty. The exhaust should be directed away from the operator.

### **B. Acoustical Material Added to Operator Area**

In smaller cranes, install a barrier behind the operator to provide isolation from the low frequency noise emitted from the diesel engine. The barrier can be composed of a mass-loaded, vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. Fiberglass absorptive material should be placed on the ceiling and other flat surfaces in the operator's compartment. This material will absorb any sound which enters the cab. Suppliers of these materials are listed in Appendix A.

## **3. Alternative Technology**

There is no alternative technology.

## ***DRAGLINES***

A dragline is a type of excavating equipment which casts a cable-hung bucket a considerable distance and then collects the loose material by pulling the bucket back toward itself with a second cable. It then elevates the bucket and dumps the material on a spoil bank.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for draglines. Local dealers should be contacted for specific needs and details.

<b>Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Standard Sound-Suppressed Environmental Cab w/air-conditioning and muffler(s)</b>
Bucyrus Erie Company (Bucyrus International)	X
P & H Mining	X
Indresco, Inc. -- Marion Division (Bucyrus International)	X
Manitowoc Engineering	X
Mannesmann Demag Corporation	X
Northwest Engineering Company (Telex)	X
"X" indicates product availability.	

### **2. Retrofit Noise Controls**

Retrofit noise controls kits are unavailable from the OEMs.

In smaller draglines, all openings to the engine and hoist/drag assemblies should be sealed off from the operator's compartment and sound-absorptive material installed on the walls and roof of the compartment. A barrier should be installed behind the operator to provide isolation from the low frequency noise emitted by the diesel engine. The barrier can be composed of a mass-loaded, vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. In larger draglines, if possible, motor generator (MG) sets should be isolated with a sound barrier. Care must be taken not to restrict air flow around the MG sets causing overheating. Sound damping material can be applied to the surfaces of specific components, such as hoist and drag transmissions, to reduce radiated sound. Sound absorptive/barrier/damping materials are available from a number of manufacturers. Suppliers of these materials are listed in Appendix A.

Sound from fans (cooling, exhaust) may be reduced by changing fan speed and pitch.

Other potential engineering controls include, but are not limited to, the use of closed circuit TV for monitoring areas of high noise levels; heat and vibration sensors for monitoring in a quiet area; and installation of automatic lubrication systems.

Replacement parts are commercially available for the exhaust systems, (i.e. manifold, mufflers, pipes, clamps) from the engine manufacturer, or the following suppliers:

Donaldson Company, Inc.  
1400 W. 94th Street  
Minneapolis, MN 55431  
Phone: 612.887.3330

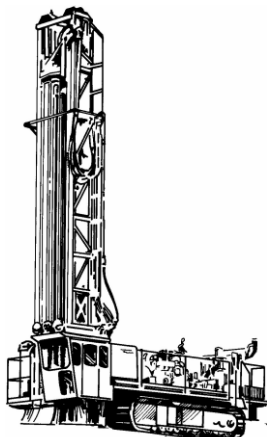
Nelson Industries, Inc.  
P.O. Box 428  
Stoughton, WI 53589  
Phone: 608.873.4200

### **3. Alternative Technology**

There is no alternative technology.

## ***DRILLS – SURFACE***

Drills are designed to penetrate the earth. They range in size from hand-held to over-the-road-size trucks. Some of the most common are blast-hole drills, slot drills, trimming drills, and jackhammer drills. Drills are generally classified as percussive, rotary, or hydraulic.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for new drills. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>		
<b>Manufacturer</b>	<b>Exhaust Mufflers</b>	<b>Cab with Acoustical Treatment for Medium and Large Drills</b>
Ingersoll-Rand	X	X
Reed-Gardner/Denver	X	X
Erie	X	X
Tamrock/Driltech	X	X
Joy Mfg./Sullivan Ind.	X	X
Gill	X	X
“X” indicates product availability.		



## 2. Retrofit Noise Controls

**Medium and Large Size Drills** - The following table illustrates OEMs offering retrofit noise control packages. Local dealers should be contacted for availability and further details.

<b>Retrofit Noise Control Availability from OEMs</b>			
<b>Manufacturer</b>	<b>Exhaust Mufflers</b>	<b>Cab with Acoustical Treatment for Medium and Large Drills</b>	<b>Other Treatments</b>
Ingersoll-Rand	X	X	Barrier shield available for small drills
Reed-Gardner/Denver	X	X	None
Drill Tech	X	X	None
Erie	X	X	None
Tamrock	X	X	None
Joy Manufacturing	X	X	None
Gill	X	X	None
Novamac	X	X	Noise shield for P212V model
“X” indicates product availability.			

If retrofit noise control kits or options are not commercially available, the following illustrates the “do-it-yourself” approach that can be installed on-site.

### A. For Medium and Large-Size Drills

#### 1. Exhaust Mufflers

Install an appropriate exhaust muffler if one is not present.

## 2. Operator Cab with Acoustical Treatment

These are available from the OEM. There may be some cases where additional work needs to be conducted before the cab can be installed, such as relocating hoses or controls. This will add to the cost of the retrofit installation. Some cabs may also be available through a specialty cab company or third party.

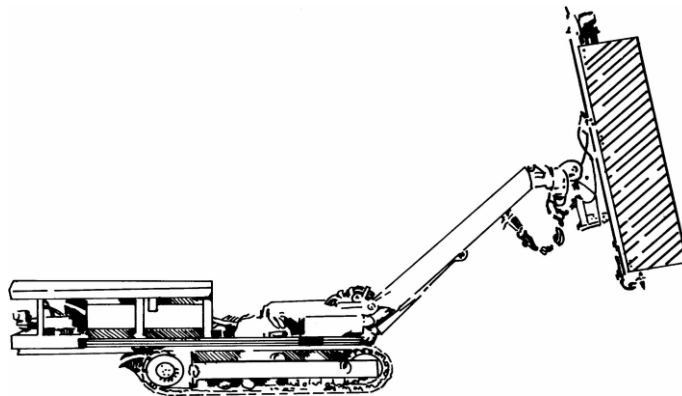
### B. Small-Size Drills (Air Tracks)

#### 1. Exhaust Mufflers

Install an appropriate exhaust muffler, making sure it is matched to the engine specifications.

#### 2. Barrier Shield

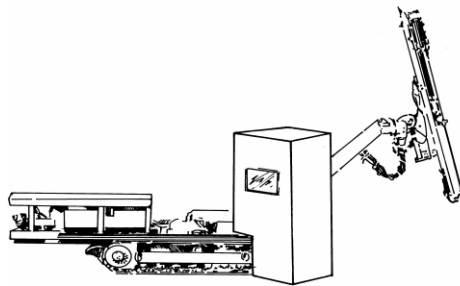
Mount shield on the drill mast by installing an angle iron framework to the mast of the drill and then cover the framework with readily available material, such as conveyor belting or plywood. An “acoustic shadow zone” is created at the drill controls. When the drill operator stands inside this “acoustic shadow zone,” the sound levels are typically reduced by 4-10 dBA. The following illustrations depict the barrier shield. For maximum effectiveness and safety, the barrier shield should be shaped as an “L” and extended from approximately 15 inches above the ground to 8 feet up the mast.



Barrier Shield Mounted on a Drill Mast

### 3. “Do-It-Yourself” Operator Cab

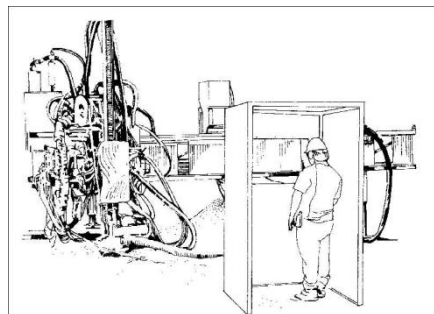
At numerous mine sites that have been investigated, the operator has constructed an operator cab on the drill unit. These cabs can be constructed of sheet metal or flame-retardant plywood. The inside of the cab is lined with an acoustical material. Depending upon the specific drill, the cab can be attached to the drill unit at the mast or at the tramming controls. Once the drill steel is started, the drill operator moves into the cab to observe the drilling. In some situations, automatic drill steel changers can also be utilized, thus permitting the drill operator to remain in the cab for longer periods of time. Typical noise reductions have been 10 dBA or more. In most cases, there will be no instability or balance problems associated with mounting the cab on the drill unit. The following illustration depicts one of these “do-it-yourself” operator cabs.



Drill with Make-Shift Cab Attached

### 4. Three-Sided-Enclosure

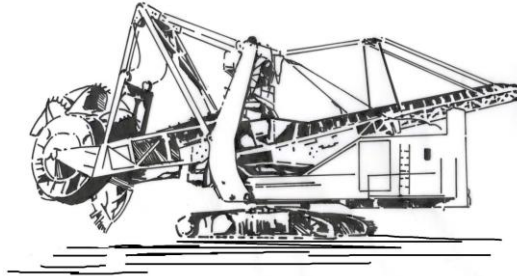
Drills can be equipped with umbilical or radio-remote controls. Using this approach, the drill operator is relocated to a distance from the drill in an area of lower sound levels. In most cases, the OEM must be contacted for availability of radio remote controls for this application. Additionally, a portable three-sided operator's enclosure, as shown below, that can be moved along with the drill, is very effective when used in conjunction with a remote control. The enclosure could have wheels and handles for transport. A fixed base with an eye-hook can be used, which is moved with another piece of mining equipment. The driller, while standing within the enclosure, would be surrounded by three sides and a ceiling giving him adequate protection against high sound levels.



Portable Operator Enclosure

### ***EXCAVATORS - BUCKET WHEEL***

Bucket wheel excavators dig with multiple buckets mounted on the circumference of a rotating wheel structure. The wheel discharges the material onto a conveyor belt, which terminates into a hopper or a truck. These machines are generally utilized for overburden excavation or reclamation work.



#### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for new bucket wheel excavators as standard equipment. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Acoustically-Treated Cabs</b>
Krupp Industries	X
O&K Orenstein & Kopper	X
Robins Engineers	X
"X" indicates product availability.	

For bucket wheel excavators without noise controls, additional retrofit noise controls are needed.

#### **2. Retrofit Noise Controls**

This section deals with bucket wheel excavators without any noise controls. The effectiveness of the retrofit noise controls is dependent upon the quality of both the acoustical materials and the installation.

The following manufacturers should be contacted for information regarding retrofit noise control kits or options.

<b>Retrofit Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Acoustical Treatment for Cabs</b>
Krupp Industries	Price varies with size
Robins Engineers	Price varies with size

The following are the major areas where retrofit noise controls should be considered.

#### **A. Operator's Control Area**

The most effective retrofit noise control for bucket wheel excavators is an acoustically-treated operator's cab. If the cab structure is not present, then either a custom cab builder should be contacted or a "do-it-yourself" cab should be built by maintenance personnel. A list of custom cab building companies appears in Appendix C. These manufacturers have numerous cabs available for a wide range of equipment. In some situations, where a large number of custom cabs are needed, the custom cab manufacturer may design and fabricate the cab for installation on the specific machine.

For a "do-it-yourself" cab installation, the following overview focuses on the areas of prime concern regarding cab design.

1. A rigid frame work of tubular steel should be employed.
2. The outer surface should be constructed of sheet metal or plywood.
3. The inside surfaces should be treated with the appropriate acoustical materials.
4. Doors and windows should be composed of safety glass and sealed to prevent leaks.
5. An environmentally-controlled interior should be provided, consisting of heating/air-conditioning and a filtered air supply.

#### **B. Exhaust System for Diesel Engines**

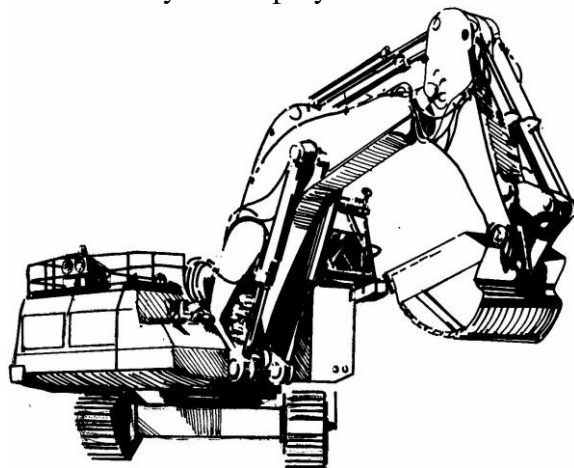
The exhaust system for diesel engines should be equipped with an appropriate exhaust muffler, directed away from the operator.

### **3. Alternative Technology**

There is no alternative technology.

### ***EXCAVATORS - WHEEL OR TRACK***

Excavators are mounted on either wheels or tracks and are diesel powered hydraulically operated. They can be configured as a hoe to dig down and back, toward itself, or as a shovel that digs up and away from itself. They are employed in removal of overburden or ore loading.



#### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for new wheel or track excavators as standard equipment. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Acoustically-Treated Cab</b>
Badger Equipment	X
Caterpillar	X
Dresser/Komatsu	X
Gradall Hydraulic	X
Koehring Hydraulic	X
Liebherr America	X
Melroe Bobcat	X*
Takeuchi Manufacturing, Ltd.	X*
"X" indicates product availability. * Some models	

For excavators without noise controls, additional retrofit noise controls are needed. For details regarding retrofit noise control applications, refer to Section 2.

## **2. Retrofit Noise Controls**

This section deals with excavators without noise controls. The effectiveness of the retrofit noise controls is dependent upon the quality of both acoustical materials and its installation.

Major areas where retrofit noise controls should be considered include:

### **A. Operator's Control Area**

The most effective retrofit noise control for wheel or track excavators is an acoustically-treated operator's cab. If the cab structure is not present, then either a custom cab builder should be contacted or a "do-it-yourself" cab should be built by maintenance personnel. A list of custom cab builders appears in Appendix C. These manufacturers have numerous cabs available for a wide range of equipment. In some situations, where a large number of custom cabs are needed, the custom-built cab manufacturers may design and fabricate the cab for installation on a specific machine.

For a "do-it-yourself" cab installation, the following overview focuses on the areas of prime concern regarding cab design.

1. A rigid frame work of tubular or angle iron steel should be employed.
2. The outer surface should be constructed of flame-retardant plywood or sheet metal.
3. Inside surfaces should be treated with the appropriate acoustical materials.
4. Doors and windows should be composed of safety glass and well-sealed to prevent leaks.
5. An environmentally-controlled interior should be provided consisting of heating/air-conditioning and a filtered air supply.

### **B. Exhaust System for Diesel Engines**

The exhaust system for diesel engines should be equipped with an appropriate exhaust muffler.

## **3. Alternative Technology**

There is no alternative technology.

## **FRONT-END LOADERS**

A front-end loader is a wheel- or crawler-mounted tractor with a front-mounted bucket. It is utilized in excavating, loading, and transporting material. Because of its versatility, it is found in a wide variety of mining applications. Its articulated frame gives the machine excellent maneuverability. Standard equipment is noted; optional equipment shows cost.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise controls for new front-end loaders. Local dealers should be contacted for further details.

<b>Noise Control Availability from OEMs</b>			
<b>Manufacturer</b>	<b>Fully-Treated Cab</b>	<b>Optional Cab</b>	<b>Muffler</b>
Caterpillar	X	None	X
Coyote	X	None	X
Kawasaki	X	None	X
Komatsu/Dresser	X	None	X
Marathon/LeTourneau	X	None	X
Hitachi	X	None	X
Fiat-Allis	X	None	X
O&K Trojan	X	None	X
Terex	X	None	X
Unit Rig (Dart)	X	None	X
VME America	X	None	X
Case	None	X	X



<b>Noise Control Availability from OEMs</b>			
<b>Manufacturer</b>	<b>Fully-Treated Cab</b>	<b>Optional Cab</b>	<b>Muffler</b>
Kobelco	None	X	X
Mitsui	X*	X*	X
Waldon	None	X**	X
Melroe (Bobcat)	None	X	X
"X" indicates product availability. **Larger models *Smaller models			

For front-end loaders without sound suppressed cabs, retrofit noise controls are needed. For details regarding retrofit noise controls, refer to Section 2.

## 2. Retrofit Noise Controls

The following table illustrates OEMs offering retrofit noise controls for front-end loaders. Local dealers should be contacted for further details.

<b>Retrofit Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Treated Cab</b>
Case	X
Kobelco	X
Mitsui	X
Waldon	X
Melroe (Bobcat)	X
"X" indicates product availability.	

Additional retrofit noise controls are aftermarket add-on cab kits. Appendix C lists dealers of aftermarket cab kits.

Existing cabs should be lined with acoustical material to absorb and/or block-out sound. Appendix B lists sources for purchasing acoustical materials.

### 3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of radio remote controls on front-end loaders, in conjunction with an appropriate exhaust muffler, can reduce operator noise exposure. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated  
586 Main Street  
Glen Williams, Ontario L7G 3T6  
Canada  
Phone: 905.873.0141  
Fax: 905.877.1809

Catron, Incorporated  
58 West Shenago Street  
Sharpsville, Pennsylvania 16150-1198  
Phone: 412.962.3571  
Fax: 412.962.4310

Futaba Corporation of America  
4 Studebaker  
Irvine, California 92618  
Phone: 714.455.9888

Joy Mining Machinery  
177 Thorn Hill Road  
Warrendale, Pennsylvania 15086  
Phone: 724.779.4500

Moog Incorporated—Industrial Division  
Electrohydraulic Servocontrols  
Department T  
East Aurora, New York 14052  
Phone: 716.652.2000

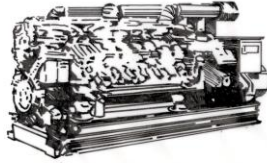
Tunnel Radio of America  
33868 Southeast Eastgate Circle  
Corvallis, Oregon 97333-2248  
Phone: 541.758.5637  
Fax: 541.758.1417

Vectran Corporation  
2170 William Pitt Way  
Oakmont, Pennsylvania 15139  
Phone: 412.826.3100

### ***GENERATORS - DIESEL ELECTRICAL***

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Generators convert one form of energy into another; specifically, mechanical energy into electrical. These machines are an excellent mobile source of power and are used extensively on surface mining operations to power conveyor belts, sizing screens, crushers, pumps, and other auxiliary machinery.



#### **1. Original Equipment Manufacturer (OEM)**

Caterpillar offers noise controls as standard equipment on new generators. Local dealers should be contacted for specific needs and details.

#### **2. Retrofit Noise Controls**

When laying out work sites, electrical generators and other noise generating equipment should be located away from work areas and especially entrances to slopes and shafts.

Noise barriers or enclosures should be installed around high noise level equipment.

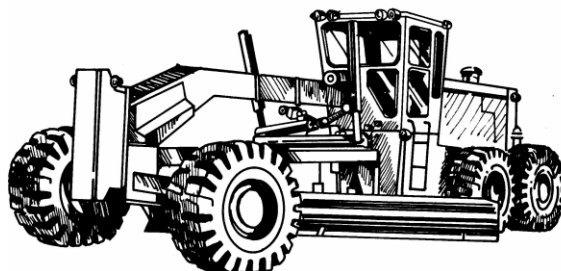
Barriers of plywood or other similar material should be constructed to reduce exposure to noise from diesel engines. An alternative would be to set up the generator at a remote location away from routine work areas.

#### **3. Alternate Technology**

There is no alternative technology.

## GRADERS

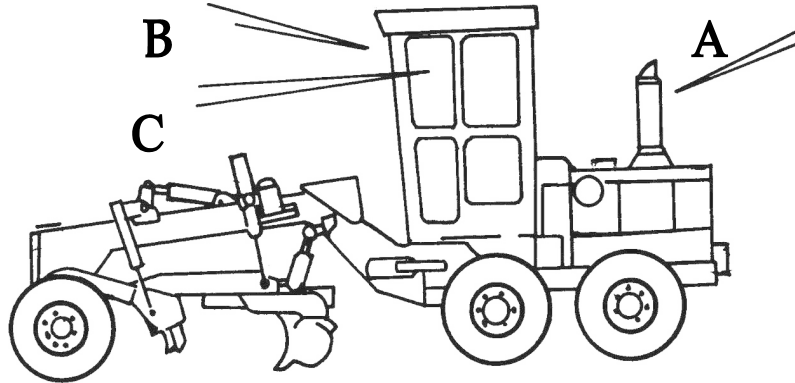
Graders are either a self-propelled or towed machine with a centrally located blade that can be angled to cast material to either side. They are commonly utilized to maintain haulage roads and in reclamation work.



### 1. Original Equipment Manufacturers (OEM)

The following table illustrates OEMs offering noise controls for new graders. Local dealers should be contacted for availability and further details.

Noise Control Availability from OEMs					
Manufacturer	Cab	Acoustic Material in Cab	Muffler	Optional Sound Suppression Kits	Optional Engine Side Hood
Kolman/Athey	X*	X	X	X*	None
Caterpillar	X	X	X	X	X
John Deere	X	X	X	None	None
Komatsu/Dresser	X	X	X	X*	X
"X" indicates product availability.				*Optional	



Locations for Retrofit Noise Controls

## 2. Retrofit Noise Controls

### A. Exhaust Muffler

An exhaust muffler should be installed if there is not one present or if the existing muffler is faulty.

### B. Acoustically-Treated Cab

If no cab exists, an acoustically-treated cab should be added to the grader. Cabs should be equipped with acoustical materials as well as air conditioning for operator comfort.

### C. Acoustical Material Added to Existing Cab

If there is an existing cab on the grader and a noise problem still exists, the cab should be treated with acoustical material. Since the major noise sources (the exhaust, the engine, and fan) are behind the operator, the rear wall of the cab should be treated with a composite-type acoustical material. This material, consisting of a high-density, vinyl septum sandwiched between two layers of fiberglass provides a barrier to sound which enters from the rear, as well as an absorber of sound that enters the cab. The rest of the cab should be treated with fiberglass absorption material. The floor should be treated with an acoustical floor mat to block sound caused by structural vibrations entering through the floor area.

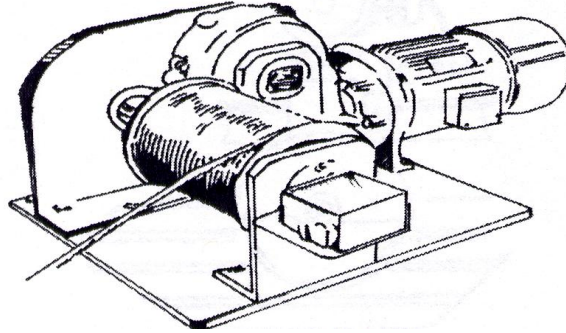
## 3. Alternative Technology

There is no alternative technology.

## ***HOISTS***

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Hoists are utilized to move equipment, material, or miners into and out of mines. They are also an intricate part of the lifting capability of a dragline.



### **1. Original Equipment Manufacturer (OEM)**

Nordberg is the only OEM offering noise controls as standard equipment on new hoists. Local dealers should be contacted for specific needs and details.

### **2. Retrofit Noise Controls**

Use prudent site planning to locate noise generating equipment away from work areas and especially entrances to slopes or shafts.

Noise barriers or enclosure should be installed around high noise level equipment.

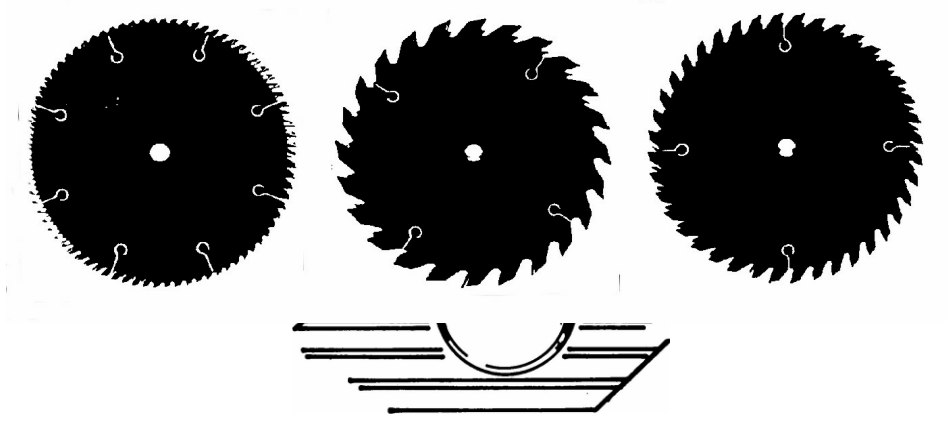
A commercially available control booth or a home-made booth should be constructed to isolate the hoist operator. An acoustically treated enclosure can be constructed from flame retardant plywood or sheet metal. The structure can be supported by treated lumber posts or iron framework. Install safety glass for windows and treat interior of booth with fiberglass absorptive blanket material.

### **3. Alternate Technology**

There is no alternative technology.

## ***SAWS – STONE***

Stone saws vary in size, from small hand-held units to those with a 10-foot diameter blade. They are utilized to shape small landscaping blocks, cut thin sheets of granite or marble, and cut slate into blocks for roofing material or other cutting purposes.



### **1. Original Equipment Manufacturer (OEM)**

The following OEM offers noise controls as standard equipment for new saws. The local dealer should be contacted for availability and further details.

W. F. Meyers Company, Inc.

For stone cutting saws without noise controls, retrofit noise controls are needed. For details regarding retrofit approaches, refer to Section 2.

### **2. Retrofit Noise Controls**

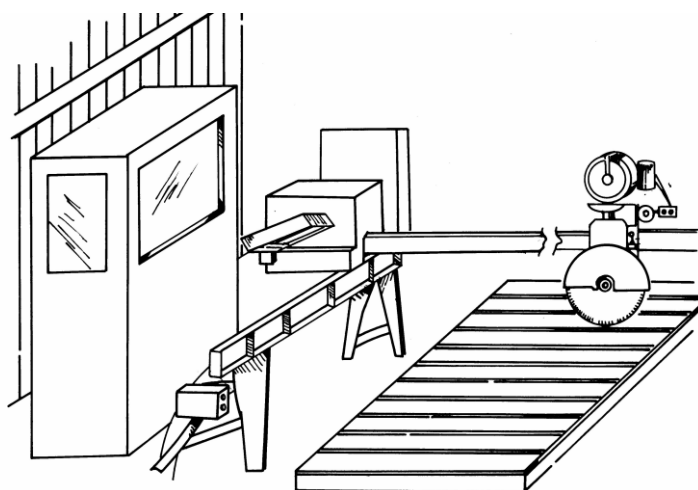
This section deals with retrofit noise controls for stone cutting saws. The following list does not necessarily contain all sources of listed items. Local distributors and service representatives should be contacted for availability.

Noise controlled cutting blades are available for existing saws.

The following lists the sources for these blades.

<b>Retrofit Noise Control Availability from OEMs</b>		
<b>Manufacturer/Distributor</b>	<b>Composite Blade Laminated</b>	<b>Silent Core Blade - w/filled expansion slots</b>
W. F. Meyers Company, Inc.	X	X
Sawing Systems, Inc.	X	None
Park Industries	X	None
New England Diamond	X	None
Consolidated Diamond	X	None
Con-Cut Blades	X	None
“X” indicates product availability.		

In addition to the above, the following retrofit measures may be implemented (refer to illustration below):



Remote Control Operation from Operator Booth

- A. A barrier or enclosure may be placed between the saw operator and the saw.
- B. Sound absorption material may be installed inside the saw blade guard.
- C. The saw may be remotely operated from an operator booth.
- D. The entire sawing operation may be automated which would minimize operator exposure.



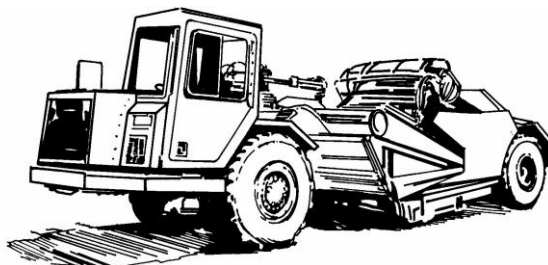
### 3. Alternative Technology

The following equipment/technology may be considered as alternative methods for cutting stone with circular stone saws.

<b>List of OEMs Providing an Alternate Method for Stone Cutting</b>				
<b>Manufacturer/Distributor</b>	<b>Automated Channel Burner</b>	<b>Waterjet Cutter</b>	<b>Narrow Belt Block Saw</b>	<b>Diamond Wire Saw</b>
Thermal Channeling	X	None	None	None
John Lutz	X	None	None	None
Park Industries	None	None	X	None
Standish Steel, Inc.	None	None	X	None
Precision Stonecraft	None	None	None	X
NedJet Cutting Systems, Inc.	None	X	None	None
“X” indicates product availability.				

## ***SCRAPERS***

Scrapers are unique machines because of their ability to excavate material in thin horizontal layers, transport the material a considerable distance and then spread the material. All units have two axles and articulated body designs. There are four basic configurations which differ in the number of engines and whether or not they have an elevator to assist in material loading. Scrapers are most commonly utilized in topsoil removal, general reclamation and overburden removal.



### **1. Original Equipment Manufacturer (OEM)**

The following table illustrates OEMs offering noise controls for new scrapers. Local dealers should be contacted for availability and further details.

<b>Noise Control Availability from OEMs</b>		
<b>Manufacturer</b>	<b>Sound Suppressed Cab</b>	<b>Air-Conditioning Unit &amp; Muffler</b>
Caterpillar	X	X
John Deere	X	X
Komatsu	X	X
Terex	X	X

Maximum noise reduction can be achieved by installing an acoustically-treated cab.

### **2. Retrofit Noise Controls**

Unfortunately, due to space limitations in the operator's cab area, only a limited amount of retrofit noise controls can be incorporated. These controls can be summarized as follows:

- A. Replacement of cracked windows and cracked door seals in the cab area.
- B. Installation of a composite-type acoustical material to the interior wall areas of the cab.
- C. Installation of an absorptive-type acoustical material to the interior ceiling area of the cab.

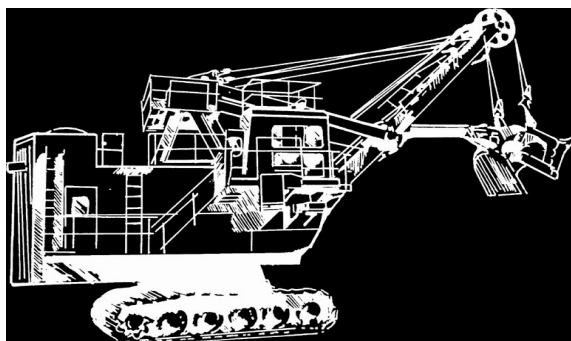
- D. Installation of a skid-resistant acoustical floor mat material to the floor area of the cab, making sure that any foot pedals and controls have complete freedom of movement.
- E. Installation of an appropriate exhaust muffler.
- F. Installation of heating, air-conditioning and filtered air units for the operator's comfort and incentive to keep doors/windows closed during operation.

### **3. Alternative Technology**

There is no alternative technology.

## ***SHOVELS***

There are two types of shovels in service: the loading shovel and the stripping shovel. The primary difference is in the size, with the stripping shovel being the larger of the two. Stripping shovels are primarily utilized to remove overburden in strip mines, while loading shovels are used to load large haulage trucks.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering standard equipment on new shovels. Local dealers should be contacted for specific needs and details.

<b>Noise Control Availability from OEMs</b>		
<b>Manufacturer</b>	<b>Sound Suppressed Cab</b>	<b>Air-Conditioning Unit &amp; Muffler</b>
Bucyrus Erie Company	X	X
Caterpillar, Inc.	X	X
Harnischfeger	X	X
Indresco, Inc.--Marion Division (Bucyrus International)	X	X
Kobelco America, Inc.	X	X
Komatsu Dresser Company	X	X
Liebherr-America, Inc.	X	X
Mannesmann Demag Corp.	X	X
"X" indicates product availability.		

## **2. Retrofit Noise Controls**

Retrofit noise controls are not available from the OEMs.

In smaller shovels all openings to the engine and cable pulley assemblies should be sealed off from the operator's compartment. Sound-absorptive material should be installed on the walls and roof of the operator's compartment. Install a barrier behind the operator to provide isolation from the low-frequency noise emitted from the diesel engine. The barrier can be composed of a mass-loaded vinyl material suspended from roller hooks mounted in a barn track or a flame-retardant plywood or metal wall containing a door. Sound absorptive/barrier materials for installation in the operator's compartment are available commercially from a number of manufacturers. Suppliers of these materials are listed in Appendix B.

Other potential engineering controls include, but are not limited to, the use of closed circuit TV, heat and vibration sensors, and the installation and use of automatic lubrication systems.

Replacement parts are commercially available for the exhaust systems (i.e., manifold, mufflers, pipes, clamps) from the engine manufacturer or the following suppliers:

Donaldson Company, Inc.  
1400 West 94th Street  
Minneapolis, Minnesota 55431  
Phone: 612.887.3330

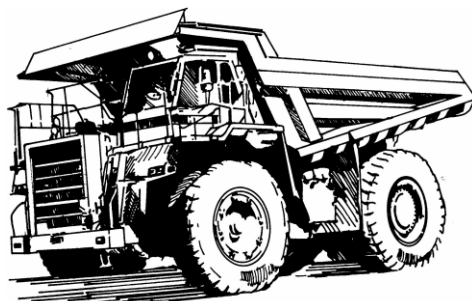
Nelson Industries, Inc.  
P.O. Box 428  
Stoughton, Wisconsin 53589  
Phone: 608.873.4200

## **3. Alternative Technology**

There is no alternative technology.

## ***TRUCKS***

Two basic truck designs are utilized in surface mining: the rear dump and the bottom dump. Truck bodies are filled by front-end loaders, hydraulic excavators, electric shovels, and bucket wheel excavators. They have either two or three axles, depending upon their size. In most cases, the noise control packages are standard equipment on these machines.



### **1. Original Equipment Manufacturers (OEM)**

The following table illustrates OEMs offering noise control packages for new trucks. Local dealers should be contacted for availability and further details.

For trucks without noise controls, additional retrofit noise controls are needed. For details regarding retrofit approaches, refer to Section 2.

<b>Noise Control Availability from OEMs</b>	
<b>Manufacturer</b>	<b>Environmental Cab</b>
Atlas Copco Wagner	X
Caterpillar, Inc.	X
Dresser--Haulpak Division	X
Indresco, Inc.--Jeffrey Division	X
Kress, Inc.	X
Liebherr Mining Truck	X
Mack Truck, Inc.	X
Moxy Truck of America	X
Payhauler Corporation	X
Terex Division	X
Unit Rig	X

Noise Control Availability from OEMs	
Manufacturer	Environmental Cab
VME North America	X
Volvo Construction Equipment	X
“X” indicates product availability.	

## 2. Retrofit Noise Controls

This section is for trucks without noise controls. The effectiveness of noise controls is dependent upon the quality of both acoustical materials and installation.

Typically, acoustical absorptive material is applied on all cab interior walls (a composite material is placed on the firewall) and ceiling. An acoustical floor mat is installed on the floor. All openings to the outside are closed, and cracked or missing window glass is replaced. This treatment reduces airborne and structure-borne noise. Depending upon the size of the cab, the price range for these controls varies.

With an installation of this type, a filtered ventilation system with temperature control should be integrated into the cab.

Finally, a commercially-available muffler, compatible with the engine system, should be installed. If the muffler is located near the cab, then the exhaust end should be directed above the cab and away from the operator.

## 3. Alternative Technology

Radio remote control systems are now becoming available for a wide range of equipment. The use of radio remote controls on a haulage truck, in conjunction with an appropriate exhaust muffler, can offer substantial noise reductions. A partial listing of manufacturers of radio remote control systems is as follows:

Black Box, Incorporated  
Glen Williams, Ontario L7G 3T6  
Canada  
Phone: 905.873.0141  
Fax: 905.877.1809

Catron, Incorporated  
58 West Shenago Street  
Sharpsville, Pennsylvania 16150-1198  
Phone: 412.962.3571  
Fax: 412.962.4310

Futaba Corporation of America  
4 Studebaker  
Irvine, California 92618  
Phone: 714.455.9888

Joy Mining Machinery  
177 Thorn Hill Road  
Warrendale, Pennsylvania 15086  
Phone: 724.779.4500

Moog, Incorporated—Industrial Division  
Electrohydraulic Servocontrols  
Department T  
586 Main Street  
East Aurora, New York 14052  
Phone: 716.652.2000

Tunnel Radio of America  
33868 Southeast Eastgate Circle  
Corvallis, Oregon 97333-2248  
Phone: 541.758.5637  
Fax: 541.758.1417

Vectran Corporation  
2170 William Pitt Way  
Oakmont, Pennsylvania 15139  
Phone: 412.826.3100



## **APPENDIX A**

### **A Partial Listing of Machine Manufacturers**

Allis Mineral Systems (METSO)  
 20965 Crossroads Circle  
 Waukesha, WI 53186  
 Phone: 262.717.2500  
 Fax: 262.717.2501  
[www.metso.com](http://www.metso.com)

American Crane Corporation  
 202 Raleigh Street  
 Wilmington, NC 28412-6363  
 Phone: 910.395.8500  
 Fax: 910.395.8547  
[www.americancrane.com](http://www.americancrane.com)

Atlas Copco Wagner, Inc.  
 4424 North East 158<sup>th</sup> Avenue  
 Portland, OR 97230  
 Phone: 503.255.2863  
 Fax: 503.255.7175  
[www.atlascopco.com](http://www.atlascopco.com)

Badger Construction Equipment  
 217 Patenaude Drive  
 Winona, MN 55987  
 Phone: 507.454.1563  
[www.badgerequipment.com](http://www.badgerequipment.com)

Brandford Vibrator Company  
 (Cougar Vibration Company)  
 150 John Downey Drive  
 New Britain, CT 06051  
 Phone: 860.826.4106  
 Fax: 860.826.4739  
[www.cougarvibration.com](http://www.cougarvibration.com)

Brydet Development Corporation  
 16867 State Route 83  
 Coshocton, OH 43812  
 Phone: 740.623.0455  
[www.brydet.com](http://www.brydet.com)

Bucyrus International, Inc.  
 (Caterpillar)  
 1100 Milwaukee Avenue  
 South Milwaukee, WI 53172  
 Phone: 414.768.4000  
 Fax: 414.768.4474  
[www.mining.cat.com](http://www.mining.cat.com)

Cronatron Welding Systems, Inc.  
 3805 Ridgecrest Court  
 Virginia Beach, VA 23456  
 Phone: 757.560.0196 MOBILE  
 Knichols@CronatronWelding.com

Case Corporation  
 700 State Street  
 Racine, WI 53404  
 Phone: 414.636.6011  
 Fax: 414.636.7809  
[www.casecorp.com](http://www.casecorp.com)

Consolidated Diamond  
 443 Newark Pompton Turnpike  
 Wayne, NJ 07470  
 Phone: 973.694.2400  
 Fax: 973.694.2863

Caterpillar  
 100 NE Adams Street  
 Peoria, IL 61629  
 Phone: 309.675.1000  
[www.mining.cat.com](http://www.mining.cat.com)

Coyote Loader Sales, Inc.  
 6721 Chittenden Road  
 Hudson, OH 44236  
 Phone: 330.650.5101  
 Fax: 330.650.5105

Donaldson Company, Inc.  
 1400 W 94<sup>th</sup> Street  
 Minneapolis, MN 55431  
 Phone: 612.887.3131  
[www.donaldson.com](http://www.donaldson.com)

FiatAllis  
 New Holland Construction Equipment  
 621 State Street  
 Racine, WI 53402  
 Phone: 888.365.6423  
[www.newholland.com](http://www.newholland.com)

General Kinematics Corp  
 5050 Ricket Road  
 Crystal Lake, IL 60014  
 Phone: 815.455.3222  
[www.generalkinematics.com](http://www.generalkinematics.com)

Gill Rock Co., Inc.  
 903-905 Cornwall Road  
 Lebanon, PA 17042  
 Phone: 717.272.3861  
 Fax: 717.272.4140  
[www.gillrockdrill.com](http://www.gillrockdrill.com)

Global Manufacturing, Inc.  
 1801 East 22nd Street  
 Little Rock, AR 72206  
 Phone: 501.374.7416  
 Fax: 501.376.7147  
[www.globalmanufacturing.com](http://www.globalmanufacturing.com)

Gradall Industries, Inc.  
 406 Mill Avenue South West  
 New Philadelphia, OH 44663  
 Phone: 330.339.2211  
[www.gradall.com](http://www.gradall.com)

Hager Equipment Co., of Alabama, Inc.  
 1901 Morgan Road S. E.  
 Bessemer, AL 35022-4812  
 Phone: 205.424.1363  
[www.hagerequipment.com](http://www.hagerequipment.com)

Harnischfeger Industries, Inc.  
 3600 South Lake Drive  
 St. Francis, WI 53235  
 Phone: 414.486.6400  
<http://www.joyglobal.com>

Hewitt-Robins Conveyor  
 (Goodman Hewitt Conveyor)  
 40 Fairfield Place  
 West Caldwell, NJ 07006  
 Phone: 973.777.5500  
[www.goodman-hewitt.com](http://www.goodman-hewitt.com)

Hypertherm  
 12304 South 18<sup>th</sup> Street  
 Jenks, OK 74037  
 Phone: 918.299.9676  
[www.hypertherm.com/](http://www.hypertherm.com/)

Indresco, Inc.  
 617 West Centre Street  
 Marion, OH 43302  
 Phone: 614.383.5221  
 Fax: 614.382.2052

Ingersoll Rand  
 1495 Valley Center Parkway  
 Bethlehem, PA 18017  
 Fax: 610.882.8847  
[www.ingersollrand.com](http://www.ingersollrand.com)

Iskco Ltd.  
 P. O. Box 13274  
 Maumelle, AR 72113-0274  
 Phone: 501.812.0220  
[www.iskco.com](http://www.iskco.com)

John Deere Company  
 1175 East 90<sup>th</sup> Street  
 Davenport, IA 52804  
 Phone: 319.388.4200  
 Fax: 319.388.4503  
[www.deere.com](http://www.deere.com)

Joy Mining Machinery  
 177 Thorn Hill Road  
 Warrendale, PA 15086  
 Phone: 724.779.4500  
[www.joyglobal.com](http://www.joyglobal.com)

Joy Mining Machinery  
2101 West Pike Street  
Houston, PA 15342  
Phone: 724.873.4200  
[www.joyglobal.com](http://www.joyglobal.com)

Joy Mining Machinery  
26161 Old Trail Road  
Abingdon, VA 24210  
Phone: 540.628.4141  
[www.joyglobal.com](http://www.joyglobal.com)

Kinergy Corporation  
7310 Grade Lane  
Louisville, KY 40219  
Phone: 502.366.5685  
Fax: 502.366.3701  
[www.kinergy.com](http://www.kinergy.com)

Kobelco America, Inc.  
12755 South Kirkwood Road  
Stafford, TX 77477  
Phone: 281.240.4800  
Fax: 281.240.4906  
[www.kobelcoamerica.com](http://www.kobelcoamerica.com)

Koehring Cranes, Inc.  
106 12th Street South East  
Waverly, IA 50677  
Phone: 319.352.3920

Kolman Athey  
1839 South Main St.  
Wake Forest, NC 27587-9289  
Phone: 919.556.5171  
Fax: 919.556.9503

Komatsu Mining Systems, Inc.  
440 North Fairway Drive  
Vernon Hills, IL 60061  
Phone: 847.970.4100  
[www.komatsuamerica.com](http://www.komatsuamerica.com)

Komatsu Dresser Company  
200 Tri-State International  
Lincolnshire, IL 60069  
Phone: 708.831.6700  
Fax: 703.831.7211

Kress Corporation  
PO Box 229  
Brimfield, IL 61517  
Phone: 309.446.3395  
Fax: 309.446.9625

Krupp Canada  
1177 11th Avenue Southwest  
Suite 405  
Calgary, Alberta T2R 0G5  
Canada  
Phone: 403.245.2866  
Fax: 403.245.2866  
[www.krupp-ag.com](http://www.krupp-ag.com)

Letourneau, Inc.  
PO Box 2307  
Longview, TX 75606-2307  
Phone: 903.236.6535  
Fax: 903.236.6585  
[www.letourneauinc.com](http://www.letourneauinc.com)

Liebherr Mining Truck, Inc.  
4100 Chestnut Avenue  
Newport News, VA 23605-2496  
Phone: 804.245.5251

Lutz Equipment Company  
1851 Morning Glory Drive  
Elberton, GA 30635  
Phone: 706.283.7428

Mack Trucks  
(Volvo Group)  
2100 Mack Boulevard  
Allentown, PA 18104  
Phone: 610.395.6801 or  
866.298.6586  
[www.macktrucks.com](http://www.macktrucks.com)

Magnum Manufacturing, Inc.  
 Eric Wolfe  
 8979 Lager Road  
 Phelan, CA 92371  
 Phone: 760.868.6748  
[www.magnumusa.com](http://www.magnumusa.com)

Manitowoc Cranes, Inc.  
 PO Box 70  
 Manitowoc, WI 54221-0070  
 Phone: 920.684.6621  
 Fax: 920.683.6277  
[www.manitowoc.com](http://www.manitowoc.com)

Mannesman Demag Corporation  
 29201 Aurora Road  
 Cleveland, OH 44139  
 Phone: 440.248.2400  
 Fax: 440.248.3874

Martin Engineering  
 1424 Wellington  
 Lansing, MI 48910  
 Phone: 517.487.5826  
 Fax: 517.374.7414  
[www.martin-eng.com](http://www.martin-eng.com)

Melroe Company (Bobcat)  
 112 North University Drive  
 Fargo, ND 58108-6019  
 Phone: 701.241.8700  
 Fax: 701.241.8704  
[www.bobcat.com](http://www.bobcat.com)

Mitsui  
 1000 Town Center  
 Suite 1800  
 Southfield, MI 48075  
 Phone: 248.357.3300  
 Fax: 248.355.3572  
[www.mitsui.com](http://www.mitsui.com)

Moxy Trucks of America  
 611 Shepherd Drive  
 Cincinnati, OH 45215-2168  
 Phone: 513.563.9330 or 800.423.5923  
 Fax: 513.733.9180  
[www.moxytrucks.com](http://www.moxytrucks.com)

National Crane Corporation  
 11200 North 148th Street  
 Waverly, NE 68462  
 Phone: 402.786.6300  
 Fax: 402.786.6363

Nedjet Cutting Systems, Inc.  
 Worchester, MA  
 Phone: 508.798.8546  
[www.nedcorp.com](http://www.nedcorp.com)

Nelson Industries  
 1801 U. S. Highway 51/138  
 PO Box 428  
 Stoughton, WI 53589-0428  
 Phone: 608.873.4200  
 Fax: 608.873.1552  
[www.nelsondiv.com](http://www.nelsondiv.com)

Novamac Industries, Inc.  
 449 Meloche  
 Dorval, Canada H9P2W2  
[www.novamac.com](http://www.novamac.com)

O&K Trojan  
 Orenstein & Koppel, Inc.  
 8055 Troon Circle, Suite A  
 Austell, GA 30168-7849  
 Phone: 770.739.0100  
 Fax: 770.739.0194  
 rrussell@oandk.com  
[www.oandk.com](http://www.oandk.com)

P&H Mining Company  
 4400 West National Avenue  
 PO Box 310  
 Milwaukee, WI 53201-0310  
 Phone: 414.671.4400  
 Fax: 414.671.7604

Park Industries  
6301 Saukview Drive  
St. Cloud, MN 56303  
Phone: 800.328.2309  
Fax: 320.251.8126

Payhauler Corporation  
1333 N. Kirk Road  
Batavia, IL 60510  
Phone: 630.879.6100 or 800.323.5210  
Fax: 630.879.6148

Petrogen International, LTD  
Milt Heft  
P.O. Box 1778  
San Leandro, CA 94577  
Phone: 510.569.7877  
petrogen@petrogen.com

Precision Stonecraft, Inc.  
2033 Castleway Lane  
Atlanta, GA 30345  
Phone: 404.634.8040  
Fax: 404.634.2266  
[www.stonecraft.net](http://www.stonecraft.net)

Rockmount Nassau, Inc.  
11909 NE 95th St  
PO Box 2909  
Vancouver WA 98668  
Phone: 800.272.7637  
Fax: 360.254.2332  
[www.weldit.com](http://www.weldit.com)

Salem Tool Company  
PO Box 760  
London, KY 40743-0760  
Phone: 606.528.2963  
Fax: 606.528.0026

Sawing Systems, Inc.  
2918 Cherry Street  
Knoxville, TN 37917  
Phone: 453.525.0600  
[www.sawingsystems.com](http://www.sawingsystems.com)

Takeuchi Manufacturing Co.  
1525 Broadmoor Blvd.  
Buford, GA 30518  
Phone: 770.831.0661

Tamrock Drilltech, Inc.  
PO Box 338  
Alaghua, FL 32616  
Phone: 904.462.4100  
Fax: 904.462.3247

Tamrock Loaders EJC  
860 Westlake Parkway  
Atlanta, GA 30336  
Phone: 404.346.6820 or  
800.TAMROCK  
Fax: 404.346.6821

Terex Americas  
PO Box 3107  
Tulsa, OK 74107  
Phone: 918.446.5581  
Fax: 918.446.9752  
[www.terex.com](http://www.terex.com)

Unit Rig  
(Division of Terex Corporation)  
PO Box 3107  
Tulsa, OK 74101  
Phone: 918.446.5581  
Fax: 918.445.5950  
[www.unitrig.com](http://www.unitrig.com)

Vibco Inc.  
75 Stillson Road  
P. O. Box 8  
Wyoming, RI 02898-0008  
Phone: 401.539.2392  
Fax: 401.539.2584

VME Americas, Inc.  
(Formerly Euclid-Hitachi)  
23001 Euclid Avenue  
Cleveland, OH 44117  
Phone: 216.383.3000  
Fax: 216.383.3187

W. F. Meyers Company, Inc.  
1017 14<sup>th</sup> Street  
Bedford, IN 47421  
Phone: 812.275.4485 or 800.457.4055  
Fax: 812.275.4055

Waldon, Inc.  
201 West Oklahoma Avenue  
Fairview, OK 73737  
Phone: 405.227.3711  
Fax: 405.227.2165  
[www.waldoninc.com](http://www.waldoninc.com)

## **APPENDIX B**

Buyer's Guide for Noise Control Products

(Reproduced with permission of *Sound and Vibration* magazine.)

This information is also available [www.sandv.com](http://www.sandv.com) under Issues ->

Buyers Guides -> July Issue ->Buyer's Guide to Products for Noise and Vibration Control



## Sound Absorptive Materials

1. Felts
2. Foams
3. Glass Fiber
4. Mineral Fiber
5. Perforated Sheet Metal
6. Spray-On Coatings
7. Wall Treatments

3M E-A-R  
7911 Zionsville Rd.  
Indianapolis, IN 46268  
Phone: 877.327.4332  
Fax: 317.692.3111  
[info@earsc.com](mailto:info@earsc.com)  
[www.earsc.com](http://www.earsc.com)  
(1, 2)

Acoustax Noise Barriers  
243 W Eighth St.  
PO Box 4174  
Wyoming, PA 18644  
Phone: 800.233.9601  
Fax: 570.693.3500  
[info@acoustax.com](mailto:info@acoustax.com)  
[www.acoustax.com](http://www.acoustax.com)  
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Acoustiblok, Inc.  
6900 Interbay Blvd.  
Tampa, FL 33616  
Phone: 813.980.1140  
Fax: 813.849.6347  
[info@acoustiblok.com](mailto:info@acoustiblok.com)  
[www.acoustiblok.com](http://www.acoustiblok.com)  
(5, 7)

Acoustical Surfaces  
123 Columbia Court N.  
Chaska, MN 55318  
Phone: 800.854.2948  
Fax: 952.448.2613  
[info@acousticalsurfaces.com](mailto:info@acousticalsurfaces.com)  
[www.acousticalsurfaces.com](http://www.acousticalsurfaces.com)  
(2, 5, 7)

American Acoustical Products/Ward Process  
311 Hopping Brook Rd,  
Holliston, MA 01746  
Phone: 508.429.1165  
Fax: 508.429.8543  
[info@aapusa.com](mailto:info@aapusa.com)  
[www.aapusa.com](http://www.aapusa.com)  
(2-5, 7)

Blachford, Inc.  
1400 Nuclear Drive  
West Chicago, IL 60185  
Phone: 630.231.8300  
Fax: 630.231.8321  
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[www.blachford.com](http://www.blachford.com)  
(1-5, 7)

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[info@eckelusa.com](mailto:info@eckelusa.com)  
[www.eckelusa.com](http://www.eckelusa.com)  
(5, 7)

Ferguson Perforating  
130 Ernest St.  
Providence, RI 02905  
Phone: 800.341.9800  
Fax: 401.941.2950  
[info@fergusonperf.com](mailto:info@fergusonperf.com)  
[www.fergusonperf.com](http://www.fergusonperf.com)  
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George Koch Sons, LLC.  
10 S. Eleventh Avenue  
Evansville, IN 47712  
Phone: 888.873.5624  
Fax: 877.726.5427  
[info@kochllc.com](mailto:info@kochllc.com)  
[www.kochllc.com](http://www.kochllc.com)  
(4)

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Bronx, NY 10462  
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Fax: 718.863.1138  
[info@industrialacoustics.com](mailto:info@industrialacoustics.com)  
[www.industrialacoustics.com](http://www.industrialacoustics.com)  
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401 Airport Rd.  
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[info@industrialnoisecontrol.com](mailto:info@industrialnoisecontrol.com)  
[www.industrialnoisecontrol.com](http://www.industrialnoisecontrol.com)  
(1, 4, 5, 7)

International Cellulose, Inc.  
12315 Robin Blvd.  
Houston, TX 77045  
Phone: 800.444.1252  
Fax: 713.610.4761  
[info@internationalcellulose.com](mailto:info@internationalcellulose.com)  
[www.spray-on.com](http://www.spray-on.com)  
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Kinetics Noise Control, Inc.,  
6300 Irelan Place  
Dublin, OH 43017  
Phone: 877.457.2695  
Fax: 614.889.0540  
[info@kineticsnoise.com](mailto:info@kineticsnoise.com)  
[www.kineticsnoise.com](http://www.kineticsnoise.com)  
(2, 3, 5, 7)

Maxxon Corp.  
920 Hamel Rd.  
P.O. Box 253  
Hamel, MN 55340  
Phone: 800.356.7887  
Fax: 763.478.2431  
[info@maxxon.com](mailto:info@maxxon.com)  
[www.maxxoncorporation.com](http://www.maxxoncorporation.com)  
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MBI Products Company  
801 Bond St.  
Elyria, OH 44035  
Phone: 440.322.6500  
Fax: 440.322.1900  
[info@mbiproducs.com](mailto:info@mbiproducs.com)  
[www.mbiproducs.com](http://www.mbiproducs.com)  
(7)

McGill Air Silence, LLC,  
2400 Fairwood Ave.  
Columbus, OH 43207-2700  
Phone: 614.829.1200  
Fax: 614.829.1488  
[info@mcgillairsilence.com](mailto:info@mcgillairsilence.com)  
[www.mcgillairsilence.com](http://www.mcgillairsilence.com)  
(2-7)

Metal Form Manufacturing  
5960 W. Washington St.  
Phoenix, AZ 85043  
Phone: 602.233.1211  
Fax: 602.233.2033  
[info@mfmca.com](mailto:info@mfmca.com)  
[www.mfmca.com](http://www.mfmca.com)  
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Pyrok, Inc.  
121 Sunset Rd.  
Mamaroneck, NY 10543  
Phone: 914.777.7070  
Fax: 914.777.7103  
[info@pyrokinc.com](mailto:info@pyrokinc.com)  
[www.pyrokinc.com](http://www.pyrokinc.com)  
(6, 7)

RPG Diffusor Systems, Inc.,  
651-c Commerce Drive  
Upper Marlboro, MD 20774  
Phone: 301.249.0044  
Fax: 301.390.3602  
[info@rpginc.com](mailto:info@rpginc.com)  
[www.rpginc.com](http://www.rpginc.com)  
(2, 4, 7)

Sound Fighter Systems, LLC.  
1305 Airport Dr.  
PO Box 7216  
Shreveport, LA 71137  
Phone: 866.348.0833  
Fax: 318.865.7373  
[info@soundfighter.com](mailto:info@soundfighter.com)  
[www.soundfighter.com](http://www.soundfighter.com)  
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Soundown Corporation  
16 Broadway  
Salem, MA 01970  
Phone: 978.745.7000  
Fax: 978.745.0900  
[info@soundown.com](mailto:info@soundown.com)  
[www.soundown.com](http://www.soundown.com)  
(2-5, 7)

Tectum Inc.  
105 S. 6th St.  
Newark, OH 43055  
Phone: 888.977.9691  
Fax: 800.832.8869  
[info@tectum.com](mailto:info@tectum.com)  
[www.tectum.com](http://www.tectum.com)  
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The Soundcoat Company  
1 Burt Drive  
Deer Park, NY 11729  
Phone: 800.394.8913  
Fax: 631.242.2246  
[info@soundcoat.com](mailto:info@soundcoat.com)  
[www.soundcoat.com](http://www.soundcoat.com)  
(2)

### **Sound Absorptive Systems**

1. Ceiling Systems
2. Masking Noise Generators
3. Panels
4. Unit Absorbers
5. Wall Treatments

Acoustax Noise Barriers  
243 W Eighth St.  
PO Box 4174  
Wyoming, PA 18644  
Phone: 800.233.9601  
Fax: 570.693.3500  
[info@acoustax.com](mailto:info@acoustax.com)  
[www.acoustax.com](http://www.acoustax.com)  
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Acoustiblok, Inc.  
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Tampa, FL 33616  
Phone: 813.980.1140  
Fax: 813.849.6347  
[info@acoustiblok.com](mailto:info@acoustiblok.com)  
[www.acoustiblok.com](http://www.acoustiblok.com)  
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Acoustical Surfaces  
123 Columbia Court N.  
Chaska, MN 55318  
Phone: 800.854.2948  
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[info@acousticalsurfaces.com](mailto:info@acousticalsurfaces.com)  
[www.acousticalsurfaces.com](http://www.acousticalsurfaces.com)  
(3-5)

American Acoustical  
Products/Ward Process  
311 Hopping Brook Rd,  
Holliston, MA 01746  
Phone: 508.429.1165  
Fax: 508.429.8543  
[info@aapusa.com](mailto:info@aapusa.com)  
[www.aapusa.com](http://www.aapusa.com)  
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Blachford, Inc.  
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West Chicago, IL 60185  
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Fax: 630.231.8321  
[info@blachford.com](mailto:info@blachford.com)  
[www.blachford.com](http://www.blachford.com)  
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Eckel Industries  
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Phone: 617.491.3221  
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[info@eckelusa.com](mailto:info@eckelusa.com)  
[www.eckelusa.com](http://www.eckelusa.com)  
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Ferguson Perforating  
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Fax: 401.941.2950  
[info@fergusonperf.com](mailto:info@fergusonperf.com)  
[www.fergusonperf.com](http://www.fergusonperf.com)  
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George Koch Sons, LLC.  
10 S. Eleventh Avenue  
Evansville, IN 47712  
Phone: 888.873.5624  
Fax: 877.726.5427  
[info@kochllc.com](mailto:info@kochllc.com)  
[www.kochllc.com](http://www.kochllc.com)  
(3, 5)

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Fax: 718.863.1138  
[info@industrialacoustics.com](mailto:info@industrialacoustics.com)  
[www.industrialacoustics.com](http://www.industrialacoustics.com)  
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401 Airport Rd.  
North Aurora, IL 60542  
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Fax: 800.420.4928  
[info@industrialnoisecontrol.com](mailto:info@industrialnoisecontrol.com)  
[www.industrialnoisecontrol.com](http://www.industrialnoisecontrol.com)  
(1, 3-5)

Keene Building Products  
5910 Landerbrook Dr.  
Ste #210  
Mayfield Heights, OH 44124  
Phone: 877.514.5336  
Fax: 440.605.1120  
[info@keenebuilding.com](mailto:info@keenebuilding.com)  
[www.keenebuilding.com](http://www.keenebuilding.com)  
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Kinetics Noise Control, Inc.,  
6300 Irelan Place  
Dublin, OH 43017  
Phone: 877.457.2695  
Fax: 614.889.0540  
[info@kineticsnoise.com](mailto:info@kineticsnoise.com)  
[www.kineticsnoise.com](http://www.kineticsnoise.com)  
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MBI Products Company  
801 Bond St.  
Elyria, OH 44035  
Phone: 440.322.6500  
Fax: 440.322.1900  
[info@mbiproducts.com](mailto:info@mbiproducts.com)  
[www.mbiproducts.com](http://www.mbiproducts.com)  
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McGill Air Silence, LLC,  
2400 Fairwood Ave.  
Columbus, OH 43207-2700  
Phone: 614.829.1200  
Fax: 614.829.1488  
[info@mcgillairsilence.com](mailto:info@mcgillairsilence.com)  
[www.mcgillairsilence.com](http://www.mcgillairsilence.com)  
(1, 3, 5)

Metal Form Manufacturing  
5960 W. Washington St.  
Phoenix, AZ 85043  
Phone: 602.233.1211  
Fax: 602.233.2033  
[info@mfmca.com](mailto:info@mfmca.com)  
[www.mfmca.com](http://www.mfmca.com)  
(3, 5)

Pyrok, Inc.  
121 Sunset Rd.  
Mamaroneck, NY 10543  
Phone: 914.777.7070  
Fax: 914.777.7103  
[info@pyrokin.com](mailto:info@pyrokin.com)  
[www.pyrokin.com](http://www.pyrokin.com)  
(1, 5)

RPG Diffusor Systems, Inc.,  
651-c Commerce Drive  
Upper Marlboro, MD 20774  
Phone: 301.249.0044  
Fax: 301.390.3602  
[info@rpginc.com](mailto:info@rpginc.com)  
[www.rpginc.com](http://www.rpginc.com)  
(1, 3-5)

Sound Fighter Systems, LLC.  
1305 Airport Dr.  
PO Box 7216  
Shreveport, LA 71137  
Phone: 866.348.0833  
Fax: 318.865.7373  
[info@soundfighter.com](mailto:info@soundfighter.com)  
[www.soundfighter.com](http://www.soundfighter.com)  
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Soundown Corporation  
16 Broadway  
Salem, MA 01970  
Phone: 978.745.7000  
Fax: 978.745.0900  
[info@soundown.com](mailto:info@soundown.com)  
[www.soundown.com](http://www.soundown.com)  
(1, 3, 5)

Tectum Inc.  
105 S. 6th St.  
Newark, OH 43055  
Phone: 888.977.9691  
Fax: 800.832.8869  
[info@tectum.com](mailto:info@tectum.com)  
[www.tectum.com](http://www.tectum.com)  
(1, 3, 5)

Vibro-Acoustics  
727 Tapscott Rd.  
Scarborough, Ontario,  
Canada M1X 1A2  
Phone: 800.565.8401  
Fax: 888.811.2264  
[info@vibro-acoustics.com](mailto:info@vibro-acoustics.com)  
[www.vibro-acoustics.com](http://www.vibro-acoustics.com)  
(3)

### Sound Barrier Materials

1. Pipe Lagging
2. Mass-Loaded Plastics
3. Sealants and Sealing Tapes
4. Sheet Glass, Metal and Plastic

3M E-A-R  
7911 Zionsville Rd.  
Indianapolis, IN 46268  
Phone: 877.327.4332  
Fax: 317.692.3111  
[info@earsc.com](mailto:info@earsc.com)  
[www.earsc.com](http://www.earsc.com)  
(1, 2)

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6900 Interbay Blvd.  
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Fax: 813.849.6347  
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Holliston, MA 01746  
Phone: 508.429.1165  
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[info@aapusa.com](mailto:info@aapusa.com)  
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West Chicago, IL 60185  
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[www.fergusonperf.com](http://www.fergusonperf.com)  
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[www.mcgillairsilence.com](http://www.mcgillairsilence.com)  
(1-3)

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[www.soundfighter.com](http://www.soundfighter.com)  
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[www.soundown.com](http://www.soundown.com)  
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The Soundcoat Company  
1 Burt Drive  
Deer Park, NY 11729  
Phone: 800.394.8913  
Fax: 631.242.2246  
[info@soundcoat.com](mailto:info@soundcoat.com)  
[www.soundcoat.com](http://www.soundcoat.com)  
(2)

**Sound Barrier Systems**

1. Curtains
2. Doors
3. Operable Partitions
4. Panels
5. Seals
6. Transportation Noise Barriers
7. Walls
8. Windows

Acoustax Noise Barriers  
243 W 8th St.  
Wyoming, PA 18644  
Phone: 800.233.9601  
Fax: 570.693.3500  
[info@acoustax.com](mailto:info@acoustax.com)  
[www.acoustax.com](http://www.acoustax.com)  
(3, 4, 7)

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Fax: 813.849.6347  
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(4, 6, 7)

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(1-5, 7, 8)

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Phone: 508.429.1165  
Fax: 508.429.8543  
[info@aapusa.com](mailto:info@aapusa.com)  
[www.aapusa.com](http://www.aapusa.com)  
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West Chicago, IL 60185  
Phone: 630.231.8300  
Fax: 630.231.8321  
[info@blachford.com](mailto:info@blachford.com)  
[www.blachford.com](http://www.blachford.com)  
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Acoustic Division  
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Cambridge, MA 02138  
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(2, 4, 7, 8)

George Koch Sons, LLC.  
10 S. Eleventh Avenue  
Evansville, IN 47712  
Phone: 888.873.5624  
Fax: 877.726.5427  
[info@kochllc.com](mailto:info@kochllc.com)  
[www.kochllc.com](http://www.kochllc.com)  
(2, 4, 6-8)

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[www.industrialnoisecontrol.com](http://www.industrialnoisecontrol.com)  
(1, 2, 4, 6-8)

Jamison Door Co.  
55 JV Jamison Drive  
Hagerstown, MD 21740  
Phone 800.532.3667  
Fax: 301.791.7339  
[info@jamisondoor.com](mailto:info@jamisondoor.com)  
[www.jamisondoor.com](http://www.jamisondoor.com)  
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Keene Building Products  
5910 Landerbrook Dr.  
Ste #210  
Mayfield Heights, OH 44124  
Phone: 877.514.5336  
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[info@keenebuilding.com](mailto:info@keenebuilding.com)  
[www.keenebuilding.com](http://www.keenebuilding.com)  
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Kinetics Noise Control, Inc.,  
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[info@kineticsnoise.com](mailto:info@kineticsnoise.com)  
[www.kineticsnoise.com](http://www.kineticsnoise.com)  
(1, 2, 4, 7)

Krieger Specialty Products  
4880 Gregg Rd.  
Pico Rivera, CA 90660  
Phone: 562.695.0645  
Fax: 562.692.0146  
[info@kriegerproducts.com](mailto:info@kriegerproducts.com)  
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[www.mcgillairsilence.com](http://www.mcgillairsilence.com)  
(1, 2, 4, 7, 8)

Metal Form Manufacturing  
5960 W. Washington St.  
Phoenix, AZ 85043  
Phone: 602.233.1211  
Fax: 602.233.2033  
[info@mfmca.com](mailto:info@mfmca.com)  
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(2, 4, 6, 7)

Noble Company  
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Spring Lake, MI 49456  
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Fax: 800.272.1519  
[info@noblecompany.com](mailto:info@noblecompany.com)  
[www.noblecompany.com](http://www.noblecompany.com)  
(3)

Overly Door Company  
574 W. Otterman St.  
Greensburg, PA 15601  
Phone: 800.979.7300  
Fax: 724.830.2871  
[info@door.overly.com](mailto:info@door.overly.com)  
[www.overly.com](http://www.overly.com)  
(2, 8)

PAC International, Inc.  
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[info@pac-intl.com](mailto:info@pac-intl.com)  
[www.pac-intl.com](http://www.pac-intl.com)  
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Plywall  
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Soundproof Windows, Inc.  
4673 Aircenter Circle  
Reno, NV 89502  
Phone: 877.438.7843  
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[info@soundproofwindows.com](mailto:info@soundproofwindows.com)  
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St. Cloud Window, Inc.  
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St. Cloud, MN 53602  
Phone: 800.383.9311  
Fax: 320.255.1513  
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### **Composite Materials**

1. Barrier/Fiber Composites
2. Barrier/Foam composites
3. Masonry Units

3M E-A-R  
7911 Zionsville Rd.  
Indianapolis, IN 46268  
Phone: 877.327.4332  
Fax: 317.692.3111  
[info@earsc.com](mailto:info@earsc.com)  
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[www.soundcoat.com](http://www.soundcoat.com)  
(2)

## Composite Systems

1. Curtains
2. Enclosures/Quiet Rooms
3. Open-Plan Partitions
4. Panels
5. Quilted Composites
6. Roof Decks

Acoustax Noise Barriers  
243 W 8th St.  
Wyoming, PA 18644  
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Fax: 570.693.3500  
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Fax: 877.726.5427  
[info@kochllc.com](mailto:info@kochllc.com)  
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[www.vibro-acoustics.com](http://www.vibro-acoustics.com)  
(2, 4)

### **Vibration Damping Materials**

1. Active Dampers
2. Adhesives
3. Constrained-Layer Composites
4. Coatings
5. Sheets
6. Tapes

3M E-A-R  
7911 Zionsville Rd.  
Indianapolis, IN 46268  
Phone: 877.327.4332  
Fax: 317.692.3111  
[info@earsc.com](mailto:info@earsc.com)  
[www.earsc.com](http://www.earsc.com)  
(3, 5, 6)

Advanced Antivibration Components – AAC  
2101 Jericho Turnpike  
New Hyde Park, NY 11040  
Phone: 516.328.3662  
Fax: 516.328.3365  
[info@vibrationmounts.com](mailto:info@vibrationmounts.com)  
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(5, 6)



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### **Vibration Isolation Systems**

1. Active Isolators
2. Bases
3. Cable Isolators
4. Elastomeric
5. Floating Floors
6. Machinery Mounts
7. Pipe Connectors
8. Pneumatic
9. Seismic
10. Steel Spring
11. Vibration Dampers

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(3, 4, 9, 10)

Vibro-Acoustics  
727 Tapscott Rd.  
Toronto, Ontario,  
Canada M1X 1A2  
Phone: 416.291.7371  
Fax: 416.291.8049  
[info@vibro-acoustics.com](mailto:info@vibro-acoustics.com)  
[www.vibro-acoustics.com](http://www.vibro-acoustics.com)  
(5)

#### **Silencers**

1. Active Attenuators
2. Ducts
3. Duct Silencers
4. Electric Motor Silencers
5. Fan Silencers
6. Filter Silencers
7. General Industrial Silencers
8. High-Pressure Exhaust Silencers
9. Intake and Exhaust Silencers
10. Pulsation Dampers
11. Splitter/Louvre Silencers

Acoustical Surfaces  
123 Columbia Court N.  
Chaska, MN 55316  
Phone: 952.448.5300  
Fax: 952.448.2613  
[info@acousticalsurfaces.com](mailto:info@acousticalsurfaces.com)  
[mwww.acousticalsurfaces.com](http://mwww.acousticalsurfaces.com) (2-5, 8, 9)

Allied Witan Co.  
13805 Progress Pkwy.  
North Royalton, OH 44133  
Phone: 440.237.9630  
Fax: 440.237.9633  
[info@alwitco.com](mailto:info@alwitco.com)  
[www.alwitco.com](http://www.alwitco.com)  
(6-10)

Barry Controls  
82 South St  
Hopkinton, MA 01748  
Phone: 800.227.7962  
Fax: 508.417.7224  
[info@barrycontrols.com](mailto:info@barrycontrols.com)  
[www.barrycontrols.com](http://www.barrycontrols.com)  
(8)

Eckel Industries  
Acoustic Division  
155 Fawcett St.  
Cambridge, MA 02138  
Phone: 617.491.3221  
Fax: 617.547.2171  
[info@eckelusa.com](mailto:info@eckelusa.com)  
[www.eckelusa.com](http://www.eckelusa.com)  
(9)

Exair Corporation  
11510 Goldcoast Dr.  
Cincinnati, OH 45249-1621  
Phone: 513.671.3322  
Fax: 513.671.3363  
[info@exair.com](mailto:info@exair.com)  
[www.exair.com](http://www.exair.com)  
(7-9)

George Koch Sons, LLC.  
10 S. Eleventh Avenue  
Evansville, IN 47712  
Phone: 888.873.5624  
Fax: 877.726.5427  
[info@kochllc.com](mailto:info@kochllc.com)  
[www.kochllc.com](http://www.kochllc.com)  
(2)

Industrial Acoustics Co.  
1160 Commerce Ave.  
Bronx, NY 10462  
Phone: 718.931.8000  
Fax: 718.863.1138  
[info@industrialacoustics.com](mailto:info@industrialacoustics.com)  
[www.industrialacoustics.com](http://www.industrialacoustics.com)  
(2-9, 11)

Industrial Noise Control,  
Inc., 401 Airport Rd.  
North Aurora, IL 60542  
Phone: 800.954.1998  
Fax: 800.420.4928  
[info@industrialnoisecontrol.com](mailto:info@industrialnoisecontrol.com)  
[www.industrialnoisecontrol.com](http://www.industrialnoisecontrol.com)  
(3, 5, 7)

Kinetics Noise Control,  
Inc., 6300 Irelan Place  
Dublin, OH 43017  
Phone: 877.457.2695  
Fax: 614.889.0540  
[info@kineticsnoise.com](mailto:info@kineticsnoise.com)  
[www.kineticsnoise.com](http://www.kineticsnoise.com)  
(2, 3, 5, 7-9, 11)

McGill Air Silence, LLC,  
2400 Fairwood Ave.  
Columbus, OH 43207-  
2700  
Phone: 614.829.1200  
Fax: 614.829.1488  
[info@mcgillairsilence.com](mailto:info@mcgillairsilence.com)  
[www.mcgillairsilence.com](http://www.mcgillairsilence.com)  
(2-9, 11)

Metal Form Manufacturing  
5960 W. Washington St.  
Phoenix, AZ 85043  
Phone: 602.233.1211  
Fax: 602.233.2033  
[info@mfmca.com](mailto:info@mfmca.com)  
[www.mfmca.com](http://www.mfmca.com)  
(2, 7, 9, 11)

Silentium  
2 Bergman St.  
Tamar Science Pk.  
Rehovot 76703, Israel  
Phone: +972.8.946.8664  
Fax: +972.8.946.8604  
[info@silentium.com](mailto:info@silentium.com)  
[www.silentium.com](http://www.silentium.com)  
(1, 3-5, 7-9)

Soundown Corporation  
16 Broadway  
Salem, MA 01970  
Phone: 978.745.7000  
Fax: 978.745.0900  
[info@soundown.com](mailto:info@soundown.com)  
[www.soundown.com](http://www.soundown.com)  
(2, 3, 9)

Vibro-Acoustics  
727 Tapscott Rd.  
Toronto, Ontario,  
Canada M1X 1A2  
Phone: 416.291.7371  
Fax: 416.291.8049  
[info@vibro-acoustics.com](mailto:info@vibro-acoustics.com)  
[www.vibro-acoustics.com](http://www.vibro-acoustics.com)  
(1, 3, 5, 7, 9, 11)

## **APPENDIX C**

Partial Listing of Aftermarket Cab Manufacturers,  
Suppliers of Stud-Welding Systems

## I. MOBILE SURFACE EQUIPMENT CAB MANUFACTURERS

Angus-Palm  
315 Airport Drive  
Watertown, SD 57201  
Phone: 605.886.5681  
Fax: 605.886.6179

[www.angus-palm.com](http://www.angus-palm.com)

*OEM Cabs, ROPS & Custom Metal Fabrications*

Cabs, Rops & Attachments, Inc.  
8725 S. Gravel Pit Road  
Iron River, WI 54847  
Phone: 800.743.3993  
Fax: 715.372.8950

[www.cabs-rops.com](http://www.cabs-rops.com)

*New and Reconditioned Cabs*

Custom Products of Litchfield  
1715 South Sibley Avenue  
Litchfield, MN 55355-0070  
Phone: 800.222.5463  
Fax: 320.693.7252

[www.800cabline.com](http://www.800cabline.com)

*Custom-made Cabs*

Kenco Manufacturing  
P.O. Box 837  
Atoka, OK 74525  
Phone: 580.889.5222  
Fax: 580.889.7151

[www.kencomfg.com](http://www.kencomfg.com)

*New Cabs*

Lake Superior Cabs, Inc.  
121 West Harney Road  
Esko, MN 55733  
Phone: 800.328.1823  
Fax: 218.879.4640

[www.lakesuperiorcabs.com](http://www.lakesuperiorcabs.com)

*Reconditioned Cabs, ROPS Skin Kits*

Lankota, Inc.  
270 West Park Avenue  
Huron, SD 57350  
Phone: 866.526.5682  
Fax: 605.352.2927

[www.lankotagroup.com](http://www.lankotagroup.com)

*New and Retrofit Custom Cabs*

Saf-T-Cab Inc.  
P.O. Box 2587  
Fresno, CA 93745  
Phone: 800.344.7491  
Fax: 559.268.5822

[www.saftcab.com](http://www.saftcab.com)

*Aftermarket Cabs*

Sims Cab Depot  
P.O. Box 340  
200 Moulinette Road  
Long Sault, Ontario, Canada K0C 1P0  
Phone: 800.225.7290  
Fax: 613.534.2182

[www.cabdepot.com](http://www.cabdepot.com)

*Aftermarket Cabs and ROPS*

## II. STUD WELDERS, STUDS, COVER BUTTONS

Nelson Stud Welding  
9008 S. Thomas Avenue  
Bridgeview, IL 60455  
Phone: 708.430.3770  
Fax: 708.430.3975  
[www.nelsonstud.com](http://www.nelsonstud.com)

Stud Welding Company  
750 Glen Avenue  
Moorestown, NJ 08057  
Phone: 800.523.5092  
Fax: 856.866.1818  
[www.studweldingco.com](http://www.studweldingco.com)

## III. STICK-ON STUDS (SELF-ADHESIVE BACK)

Barrier Corporation  
9806 SW Tigard Street  
Tigard, OR 97223  
Phone: 503.639.4192  
Fax: 503.684.1515  
[www.barriercorp.com](http://www.barriercorp.com)

**APPENDIX D**

## Literature References



## I. TRADE JOURNALS

Industrial Hygiene News  
Rimbach Publishing, Inc.  
8650 Babcock Boulevard  
Pittsburgh, PA 15237  
Phone: 800.245.3182  
Fax: 412.396.9720  
[www.rimbach.com](http://www.rimbach.com)

Modern Materials Handling  
EH Publishing Network  
P.O. Box 1496  
Framingham, MA 01701  
Phone: 800.315.1578 x 294  
Fax: 508.663.1599  
[www.mmh.com](http://www.mmh.com)

Pollution Equipment News  
Rimbach Publishing, Inc.  
8650 Babcock Boulevard  
Pittsburgh, PA 15237  
Phone: 800.245.3182  
Fax: 412.396.9720  
[www.rimbach.com](http://www.rimbach.com)

Industrial Maintenance and  
Plant Operation  
Advantage Business Media  
P.O. Box 3574  
Northbrook, IL 60065  
Phone: 847.559.7560  
Fax: 847.291.4816  
[www.impomag.com](http://www.impomag.com)

New Equipment Digest  
Penton Media, Inc.  
1300 East 9th Street  
Cleveland, OH 44114  
Phone: 216.696.7000  
Fax: 216.696.8208  
[www.newequipment.com](http://www.newequipment.com)

## II. MAGAZINES

Aggregates Manager  
Randall Reilly Publishing  
2340 S River Road, # 202  
Des Plaines, IL 60018  
(847) 636-5060  
Fax: (847) 636-5077  
[www.aggman.com](http://www.aggman.com)

EHS Today  
Penton Media, Inc.  
1300 East 9th Street  
Cleveland, OH 44114  
(216) 696-7000  
Fax: (216) 696-8208  
[www.ehstoday.com](http://www.ehstoday.com)

Industrial Safety & Hygiene News  
2401 W Big Beaver Rd, Ste 700  
Troy, MI 48084  
Phone: 847.763.9534  
Fax: 847.763.9538  
[www.ishn.com](http://www.ishn.com)

Coal Age  
Mining Media, Inc.  
8751 East Hampden Avenue,  
Suite B-1  
Denver, CO 80231  
Phone: 303.283.0640  
Fax: 303.283.0641  
[www.coalage.com](http://www.coalage.com)

Engineering & Mining Journal  
Mining Media, Inc.  
8751 East Hampden Avenue,  
Suite B-1  
Denver, CO 80231  
(303) 283-0640  
Fax: (303) 283-0641  
[www.e-mj.com](http://www.e-mj.com)

Occupational Safety & Health  
1105 Media, Inc.  
9201 Oakdale Ave., Ste 101  
Chatsworth, CA 91311  
Phone: 818.814.5200  
Fax: 818.734.1522  
[www.ohsonline.com](http://www.ohsonline.com)

Rock Products

Penton Media, Inc.  
 330 North Wabash Avenue,  
 Suite 2300  
 Chicago, IL 60611  
 (312) 595-1080  
 Fax: (312) 595-0295  
[www.rockproducts.com](http://www.rockproducts.com)

Sensors

Questex Media Group  
 275 Grove Street, Suite 2-130  
 Newton, MA 02466  
 Phone: 888.552.4346  
 Fax: 617.219.8310  
[www.sensorsmag.com](http://www.sensorsmag.com)

Sound & Vibration

P.O. Box 40416  
 Bay Village, OH 44140  
 Phone: 440.835.0101  
 Fax: 440.835.9303  
[www.sandv.com](http://www.sandv.com)

Urgent Communications

Penton Media, Inc.  
 330 North Wabash Avenue,  
 Suite 2300  
 Chicago, IL 60611  
 (312) 595-1080  
 Fax: (312) 595-0295  
[www.urgentcomm.com](http://www.urgentcomm.com)

## III. GOVERNMENT PUBLICATIONS

“Noise Abatement of a  
 Pneumatic Rock Drill,”  
 Report of Investigations (RI)  
 7998, U.S. Department of  
 Interior (DOI), U.S. Bureau of  
 Mines (USBM), 1974.

“Noise Reduction of a  
 Pneumatic Rock Drill,” RI  
 8082, DOI, USBM, 1975.

“Noise Control Proceedings,”  
 Informational Circular (IC)  
 8686, DOI, USBM, 1975.

“Noise Control of Diesel-  
 Powered Underground  
 Mining Machines,” IC 8837,  
 DOI, USBM, 1979.

“Summary of Noise Controls  
 for Mining Equipment,” U.S.  
 Department of Labor (DOL),  
 Mine Safety and Health  
 Administration (MSHA),  
 1985.

“Bulldozer Noise Control,”  
 Contract Number J0177049  
 Bolt, Beranek, and Newman,  
 Inc., DOI, USBM, 1980.

“Front-End Loader Noise  
 Control,” Contract Number  
 J0395028, Bolt, Beranek, and  
 Newman, Inc., DOI, USBM,  
 1980.

“Mining Machinery Noise  
 Control Guidelines,” DOI,  
 USBM, 1983.

“Improving Barrier Insertion  
 Loss,” IR 1117, DOL,  
 MSHA, 1980.

“Compendium of Materials  
 for Noise Control,” NIOSH  
 Publication No. 80-116, 1980.

“Fabrication Manual for a  
 Reduced-Noise Auger Miner  
 Cutting Head,” IC 8971, DOI,  
 USBM, 1984.

“Retrofit Noise Control  
 Modifications for Crushing  
 and Screening Equipment in  
 the Nonmetallic Mining  
 Industry—An Applications  
 Manual,” IC 8975, DOI,  
 USBM, 1984.

“Noise Control of an  
 Underground Continuous  
 Miner-Auger Type,”  
 Informational Report (IR)  
 1056, DOL, MSHA, 1977.

“In-Plant Partial Noise  
 Enclosures for the Mining  
 Industry,” IR 1154, DOL,  
 MSHA, 1993.

## IV. REFERENCE BOOKS

“Noise Control for Buildings and Manufacturing Plants”, Bolt, Beranek, and Newman, Inc., 1981.

“Noise and Vibration Control,” Leo Beranek, 1971.

“Handbook of Noise Control,” Cyril Harris, 1957.